



PRODUCT CODE No.
137 362 40

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NOTE:

Schematic Diagram is separately attached to this manual.

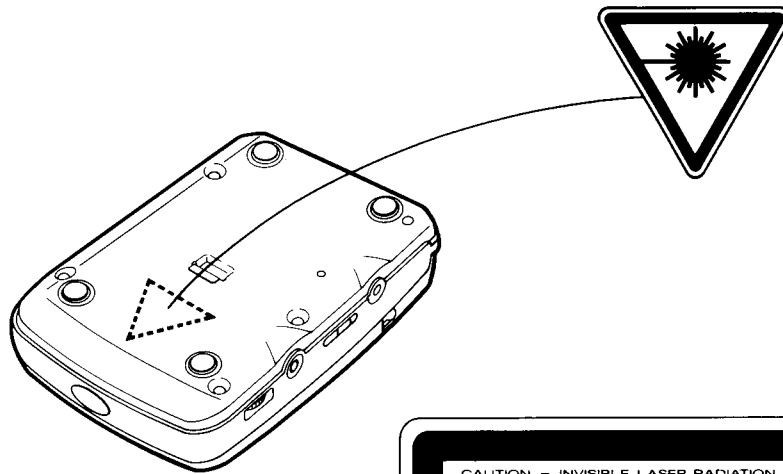
SAFETY CERTIFICATION

Laser Diode Properties

Material: Ga-Al-As

Wavelength: 755 – 815 nm (25°C)

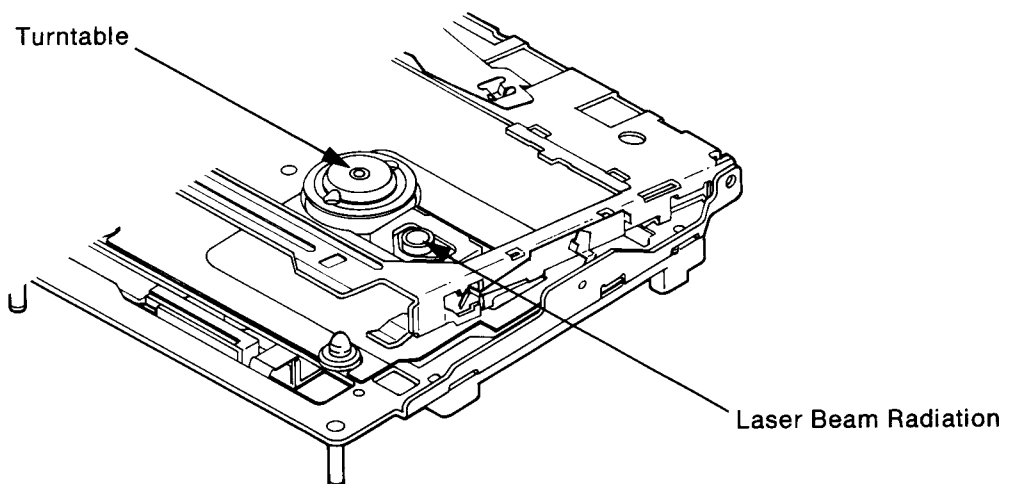
Laser Output: Continuous Wave max.0.5 mW



CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

CAUTION - INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
VORSICHT! UNSICHTBARE LASERSTRAHLUNG TRITT AUS. WENN DECKEL GEÖFFNET UND WENN SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT IST NICHT DEM STRAHL AUSSETZEN!
VARNING - OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRR ÄR URKOPPLAD. STRÅLEN ÄR FÄRLIG.
ADVARSEL - USYNLIG LASERSTRÅLING VED ÅBNING. NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

LASER BEAM RADIATION SPOT

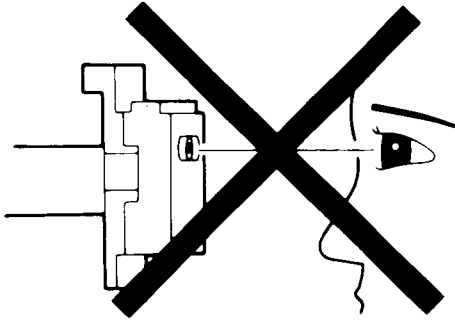


CAUTION – USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE MINIDISC PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT QUALIFIED SERVICE PERSONNEL.

LASER BEAM SAFETY PRECAUTIONS

DANGER
INVISIBLE LASER RADIATION
AVOID DIRECT EXPOSURE TO BEAM



Do not look directly at the laser beam coming from the pickup or allow it to strike your skin.

WARNING

This Portable MiniDisc Player uses a MD Pickup that emits a laser beam.

The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.

SAFETY INTERLOCK

The MiniDisc Player reads the disc signal by detecting the laser beam. It must be avoided for the human body to directly receive the beam. Especially human eyes are badly affected by the beam. Therefore, the unit is equipped with an interlock to prevent the unnecessary laser outputs.

The laser outputs are controlled by the injection or cutoff of the constant voltage source to the laser diode with Pin 26 of IC106 (MB89625). When Pin 26 is in "L" (Low) level, the laser emits the beam. When Pin 26 is in "H" (High) level, the laser does not emit the beam.

Pin 26 is set in "L" level when the unit is loaded with the disc and it reads the index signals or when the unit is set in the play mode after that. When the unit reads the index signals and the following two conditions are met, the laser emits the beam.

1. When the Loading Limit Switch is set in "CLOSE" side. (The disc tray is closed.)
2. The MD Pickup is located at the area of the minimum internal circumference.

After the above conditions are met and the index signals have been read, the laser emits the beam when the following two conditions are met.

1. When the PLAY/PAUSE button is pressed.
2. When the "TNO access" indicator is ON.

BEFORE REPAIRING THE MINIDISC PLAYER

HANDLING LASER PICKUP

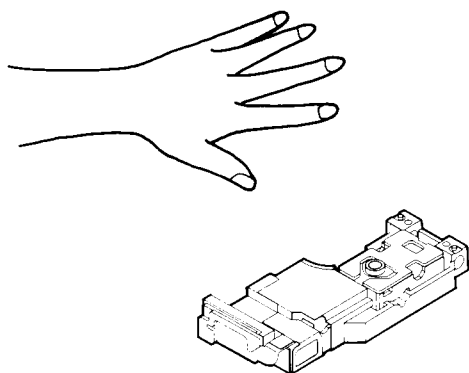
The laser diode in the optical system of this MiniDisc Player can be damaged by electrostatic discharge from clothes, body, etc. Proper electrostatic grounding for service personnel is required during servicing.

1. Preparation

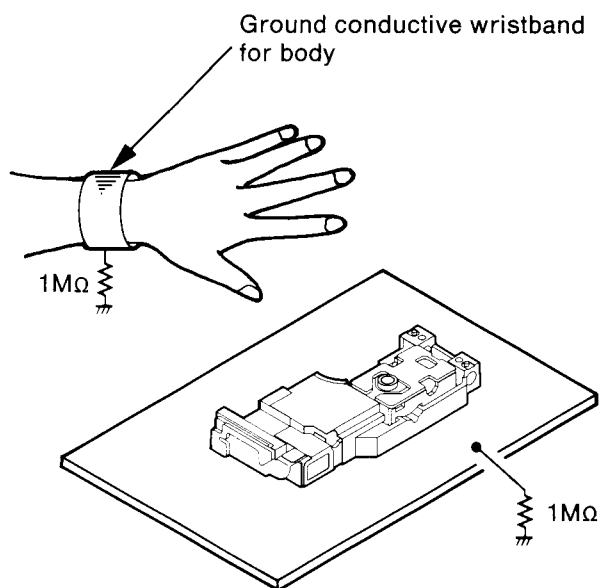
a. Human Body Grounding:

Many of the components used in this MiniDisc Player, including the laser pickup, are sensitive to electrostatic discharge. Service personnel should be grounded with an electrostatic wristband (1 M Ω).

INCORRECT



CORRECT



Caution:

Static charge on clothing does not escape through a body grounding wristband. Be careful not to contact the MD Pickup or electrical components with your clothing.

b. Workbench and Tool Grounding:

A properly-grounded electroconductive plate (1 M Ω) or metal sheet should be fitted to the workbench surface. Tools and instruments (soldering irons, scopes, etc.) should be grounded to prevent AC leakage.

DISASSEMBLY INSTRUCTIONS

GENERAL REMARKS

When disassembling this unit, be sure of the following:

- Remove all MiniDisc and Batteries inside, turn off the power, and disconnect the AC Adaptor.
- Before disassembling the unit, spread a soft rubber mat or a cloth on the workbench to avoid scratches and grease stains.
- Do not use a material which is likely to cause static electricity which can damage transistors and ICs.
- Reassemble the unit in reverse order noting the kinds of screws, the soldering, and the arrangement of the leads.
Refer to "Schematic Diagram" and the exploded views for correct assembly.
- When mounting the P.C.Board, confirm that the leads, resistors, capacitors, etc., do not contact the function mechanism such as gear or MD Pickup. Also refer to the Exploded Views.
- Reassemble in reverse order.

HANDLE WITH CARE OF LASER DIODE

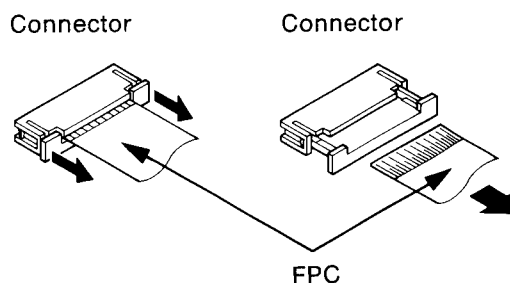
1. Destruction by Surge Current and Static Electricity.
When a large current is made to flow through the LD (Laser Diode), even for a very short time, the strong light emitted by the LD causes the LD to deteriorate or be destroyed. Also, inattentive handling of the LD drive circuit may apply a static electricity charge from the body that will immediately destroy the circuit.
2. The LD pins are shorted prior to shipping to prevent destruction by static electricity during transportation. To further protect the LD, be sure to use a body ground and a tool ground at the time of installation. To open the shorted contacts, first insert the flexible ribbon cable (FPC), then use a soldering iron.
3. When the flexible ribbon cable (FPC) of the pickup is to be disconnected from the board connector (CN101), be sure to connect the shorting pattern of the flexible ribbon cable (FPC) with a soldering iron before disconnecting the FPC since the LD of the pickup can be destroyed. (See diagram below.)

Shorting pattern



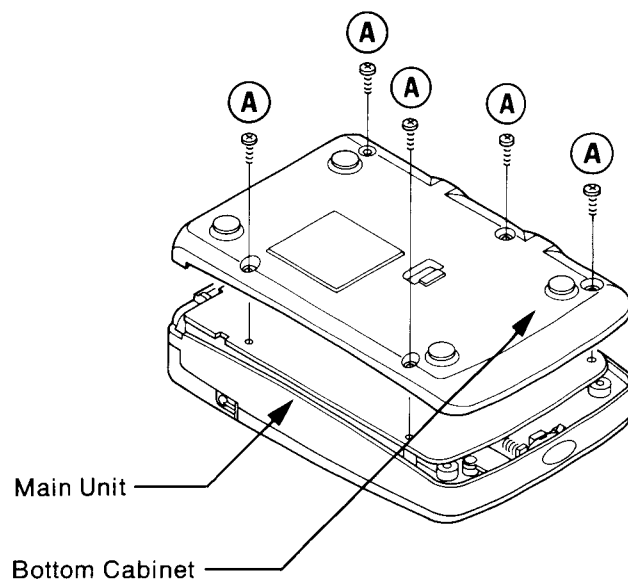
CONNECTOR REMOVAL

When the FPC is to be disconnected or connected to the connector, slide the connector side as illustrated in the diagram. Forcing a connection may damage the FPC.



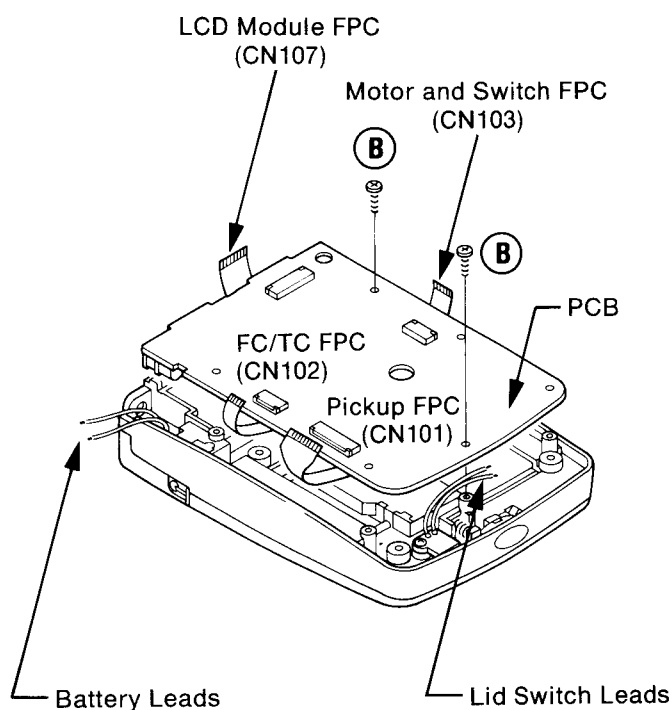
BOTTOM CABINET REMOVAL

1. Remove five A (2.0 x 6) screws which fasten the bottom cabinet, and remove the bottom cabinet from the main unit.



PRINTED CIRCUIT BOARD REMOVAL

1. Remove the bottom cabinet and disconnect the following leads and external battery jack from the PCB.
 - Positive (red) and negative (black) leads of the battery terminals.
 - Yellow and green leads of the lid switch.
 - Leads of the FPC (CN101; complete) of the pickup.
 - Leads of the FPC (CN102; complete) of FC/TC.
 - Leads of the FPC (CN103; complete) of the motor and switch.
 - Leads of the FPC (CN107; complete) of the LCD module.
 - Remove the solder at the external battery jack.
2. Remove two B (2.0 x 6) screws which fasten the PCB, and then lift the PCB and remove it while paying attention to the leads.



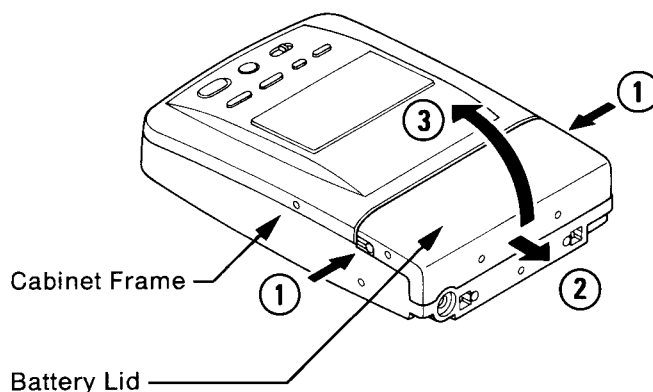
PRECAUTIONS

(When Mounting the Circuit Board)

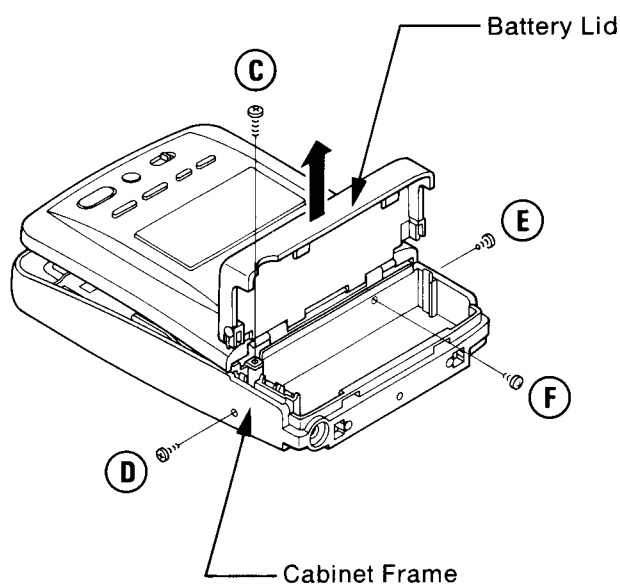
- Mount the sound adjustment S.E.S (Sound Equalization System) switch in the main unit at the same location from which it was removed.
- After mounting, check whether the switch operates properly.

MINIDISC MECHANISM REMOVAL

1. Press the button of the battery lid in the direction of the arrow (1), pull in the direction of the arrow (2), and open the lid as illustrated by the arrow (3). Remove the batteries.

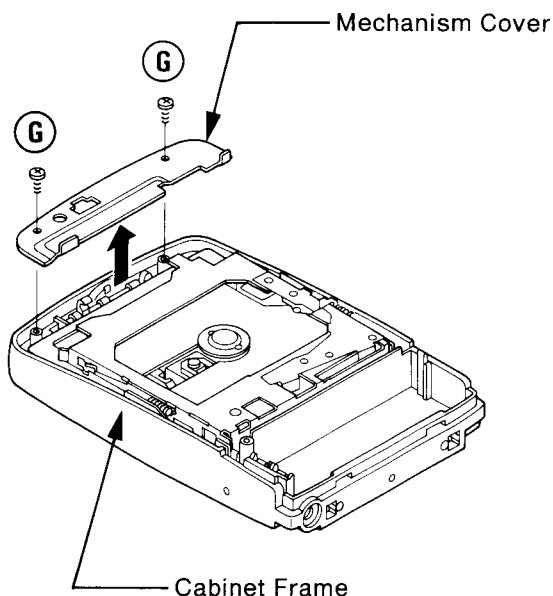


2. Remove each of the screws which fasten the battery lid: C (2.0 x 6), D (1.7 x 4), E (1.6 x 2), and F (1.7 x 2).

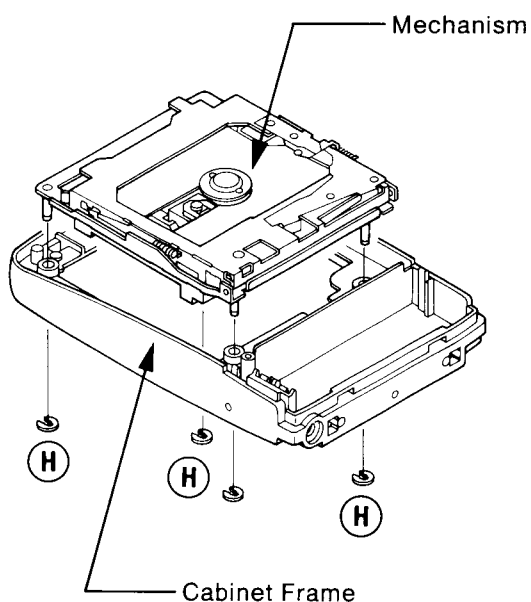


3. Pull up the battery lid in the direction of the arrow, then separate the battery lid from the cabinet frame.

4. Remove two G (2.0 x 4) screws which fasten the mechanism cover, then remove the mechanism cover from the cabinet frame.

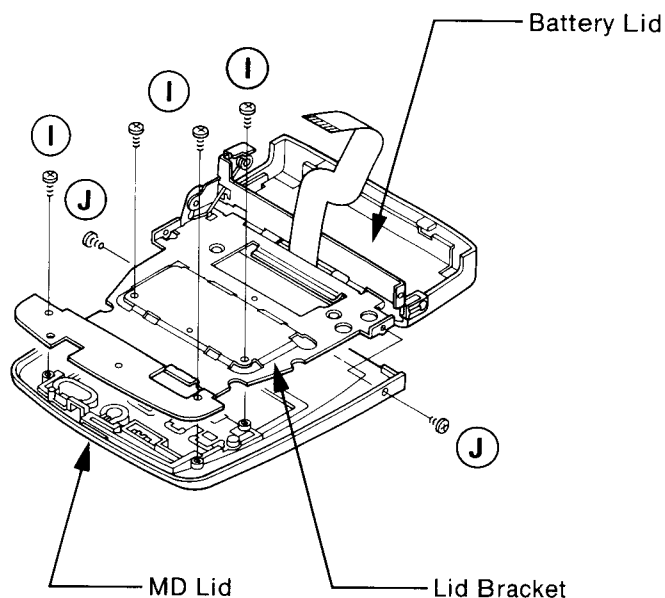


5. Remove four H (E rings) which fasten the mechanism and separate the mechanism from the cabinet frame.

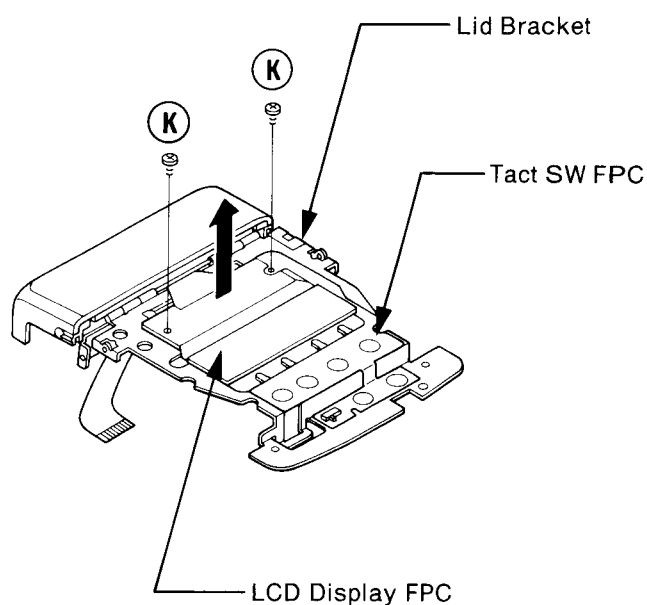


LCD DISPLAY FPC REMOVAL

1. Remove four I (2.0 x 4) screws and the two J (1.7 x 2) screws which fasten the MD lid, then remove the MD lid from the lid bracket.

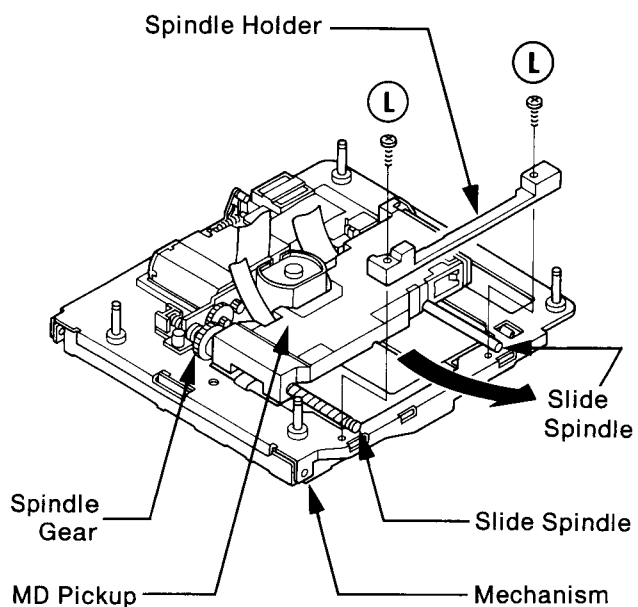


2. Remove the solder at the portion in contact with the tact switch FPC, remove two K (1.7 x 2) screws which fasten the LCD display FPC, then remove the LCD display FPC from the lid bracket.

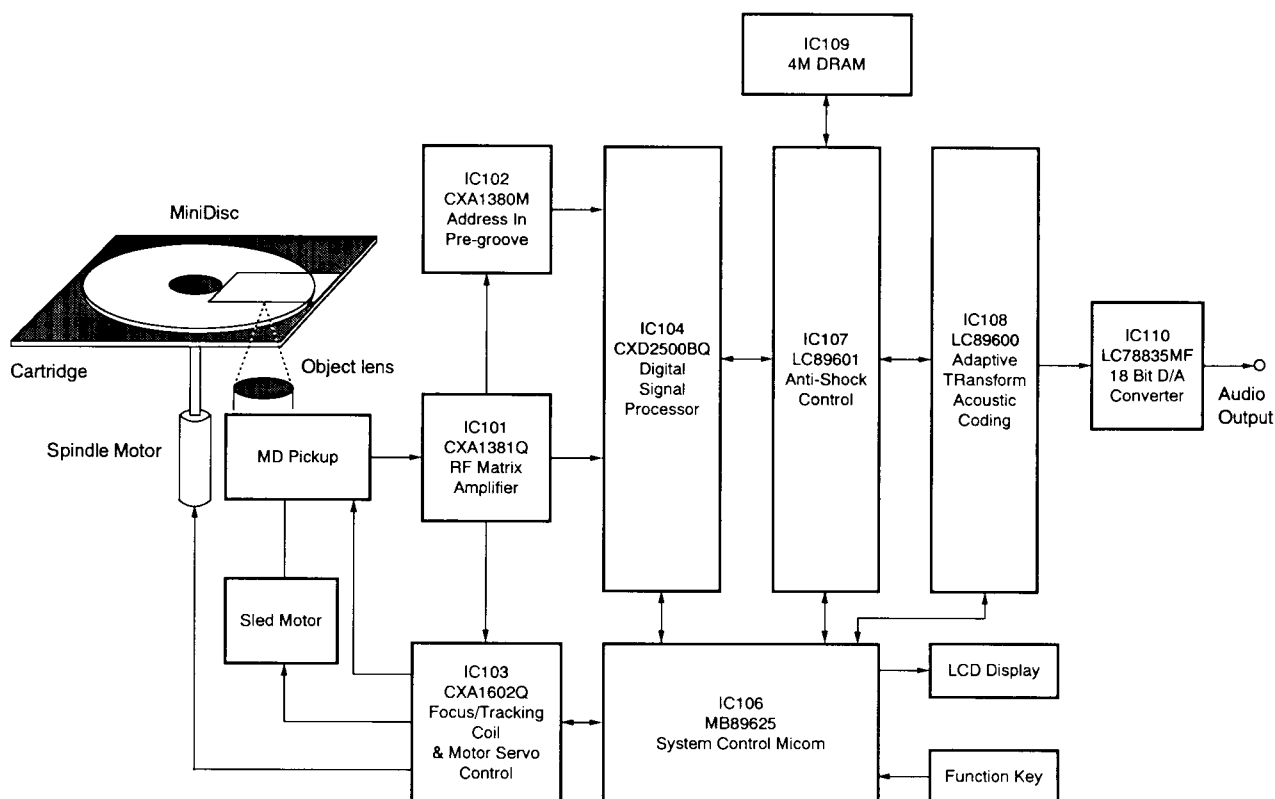


MD PICKUP REMOVAL

1. Remove two L (1.7 x 5) mounting screws of the spindle holder which fasten two slide spindles. While turning the spindle gear, move the MD Pickup and remove it from the mechanism. At this time be careful not to scratch or crease the FPC.



BLOCK DIAGRAM

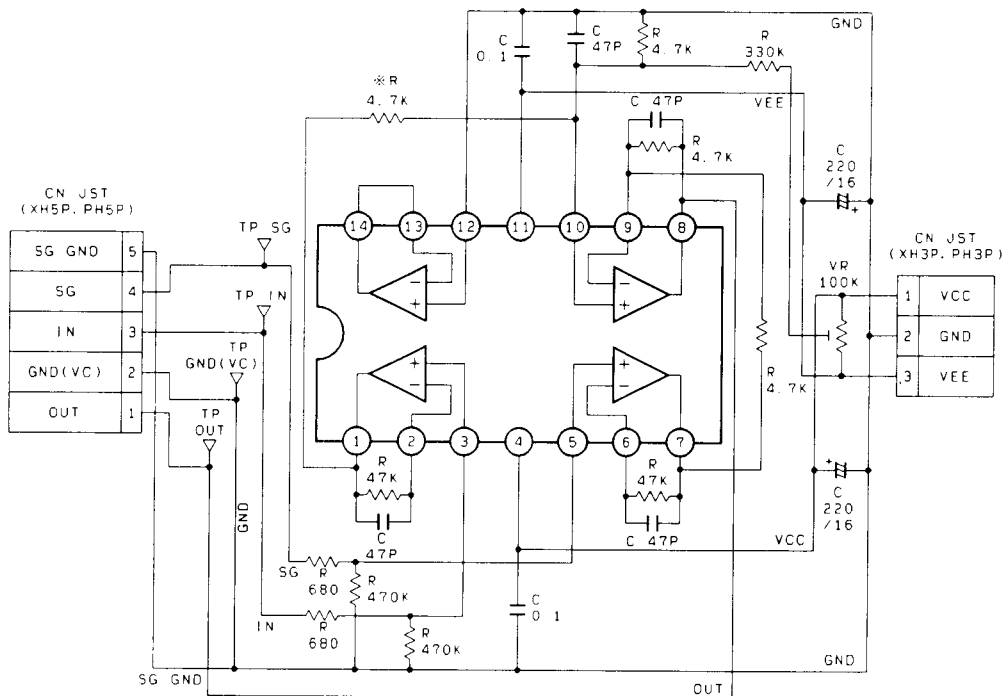


SERVO SYSTEM MEASUREMENT JIG INFORMATION

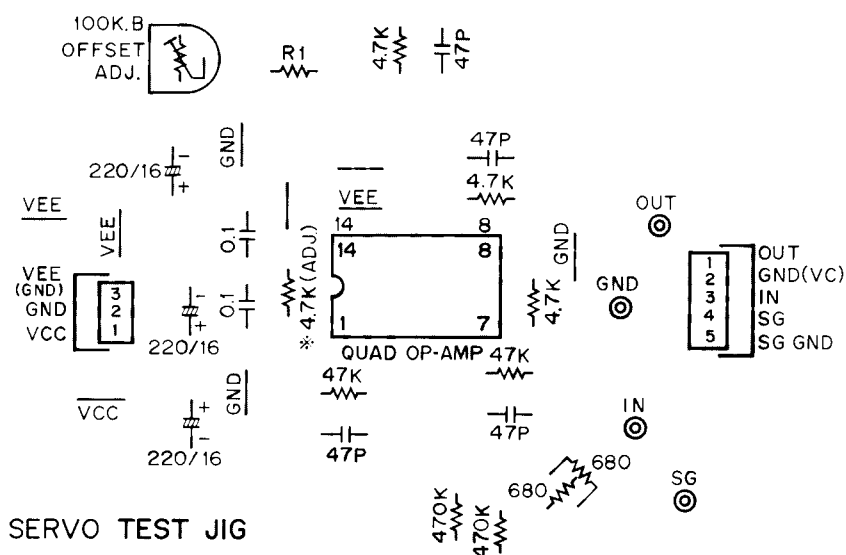
The measurement circuit diagrammed below must be used in order to adjust focus gain and tracking gain correctly.

1. Use IC NJM3403AD or an equivalent product.
2. Short the interval between **IN** and **SG**, apply 1kHz, 1Vp-p from **SG**, and adjust resistor 4.7k Ω (* Mark) so that the **OUT** output is minimum.

MEASUREMENT CIRCUIT DIAGRAM



MEASUREMENT PRINTED CIRCUIT BOARD



APPLICATION

Used in the measurement of the transfer characteristics of servo systems in CD players and other equipment.

CONNECTIONS

Cut the low-impedance line inside the servo loop and connect the IN and OUT terminals of the jig there.

Example: In the LA9210 and similar ICs, this is the TDO pin and the FDO pin.

| | |
|-----|---|
| OUT | Connect to a later stage amplifier via a resistor. |
| GND | Connect to the ground of the unit. (For units with a single power supply, connect to Vref.) |
| IN | Connect to TDO and FDO of LA9210, etc. |
| SG | Connect a signal generator (600 Ω output) |
| GND | Connect to the ground of the signal generator. |

| | |
|-----|--|
| VCC | Connect to the +10 V power supply. |
| GND | Connect to the ground of the power supply. |
| VEE | Connect to the -10 V power supply. |

MEASURING INSTRUMENTS

Generally, an FFT analyzer is used to measure the open loop characteristics and the closed loop characteristics of the servo system.

- Open loop characteristics:
Connect channel 1 of the FFT to jig OUT and channel 2 to jig IN.
- Closed loop characteristics:
Connect channel 1 of the FFT to jig SG and channel 2 to jig IN.

(Measuring Instrument Settings)

FREQ : 10 kHz
AVE : Approximately 8 times
WGT : Panning
SG : Swept sine mode
Press BOTH in the "TRANS FUNC" mode with the above settings to trace the gain in the upper portion and the phase in the lower portion.

EVALUATION METHOD

In the open loop characteristics, checks are made of the frequency and phase margin of the cross point (gain 0 point), and such items as the gain margin at the point where the phase is 0°.

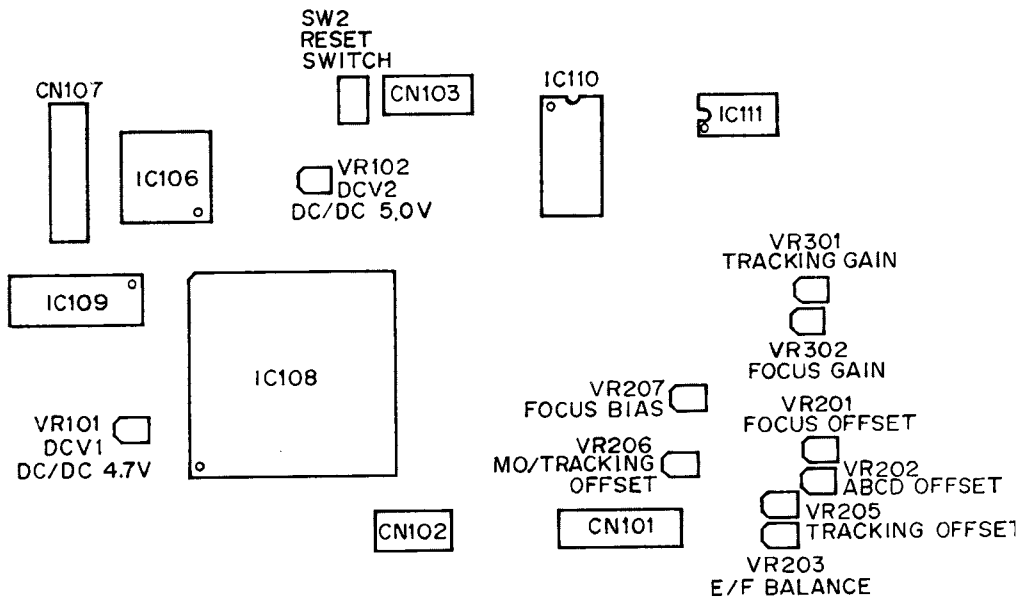
In the closed loop characteristics, checks are made of the MP value (i.e., the point of maximum gain) and the frequency of the point where the phase has turned 90°. Especially when using this jig for the gain adjustment of the servo system, the frequency at the point where the phase is 90° in the closed loop characteristics is used to permit the adjustment of the gain by means of the Lissajous method. This measurement system holds much merit and is original Sanyo technology.

MISCELLANEOUS

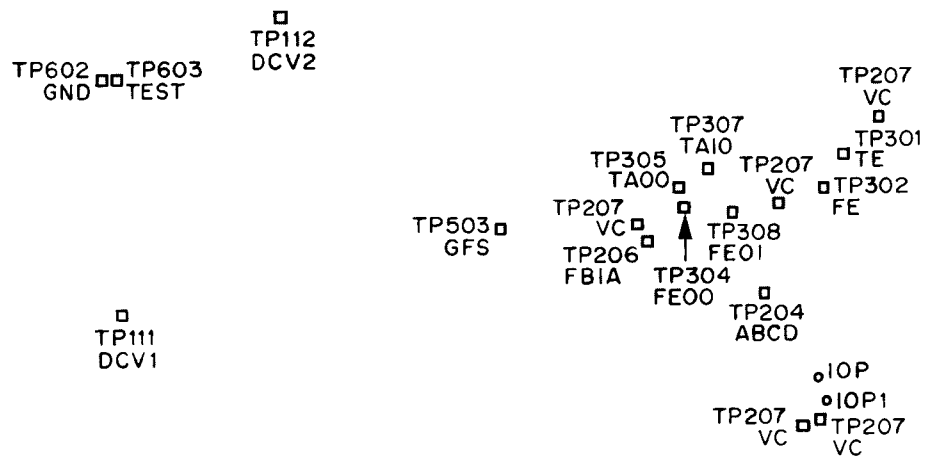
- The potentiometer of the jig is for the purpose of the offset adjustment of the jig itself and has already been adjusted.
- Connectors of 2.5 mm pitch and 2 mm pitch are used for the input and output terminals of the jig so that either type can be used.
- This jig can also be used in the measurement of spindle servo systems. The setting in this instance should have an upper frequency limit of above 100 Hz. The AVE. should be set to about 4 times.
- When applying external interference from the signal generator, be sure to monitor the waveform of the final output stage (i.e., the focus coil terminal) while setting the signal level within a range that does not cause clipping.
- When monitoring the waveform using the Lissajous method, input the SG IN terminal to the oscilloscope in the aforementioned closed loop measurement method and set the X-Y mode. If the waveform be hard to watch at this time, a low-pass filter should be inserted.

PARTS LOCATIONS FOR ADJUSTMENT

POTENTIOMETER LAYOUT



TEST POINT LAYOUT



CIRCUIT ADJUSTMENT

Adjustment Method

Up to this point topics including the handling of a Mini-Disc Player, the disassembly method of the unit, precautions prior to repair, and handling of the MiniDisc (MD) Pickup have been described. Be sure that you have read these topics before making any adjustments.

Before Checking and Adjusting

1. The description of the adjustment method of the MD Player provides an explanation of the overall adjustments at the start.
2. Even when the MD Pickup is replaced, if no problems arise from a check of each of the items, there is no need to readjust all of the items.
3. See the Circuit Diagrams, Printed Circuit Board Diagrams, and Adjustment Test Point Diagrams for information about the points and potentiometer used for making adjustments.

Required Test Discs

- Playback-Only MD: TGYS-1 (SONY) or commercial MD Software
- Recordable MD: MD that has been recorded

Required Measuring Instruments

- Constant voltage DC power supply, and ammeter
The unspecified DC power supply is to have a power supply voltage of 5.7 V, 1.5 A current, and limiter ripple voltage of 5 mV or less. The output impedance including the connection cables is to be 0.1 Ω or less.
 - AC adapter (Supplied item; part number 6CV-230ES)
 - Oscilloscope (Dual trace, 40 MHz or higher)
 - Multi-voltmeter
 - Simple laser power meter
 - Low frequency signal generator (SG)
 - Servo system adjustment jig (Measurement circuit specified by Sanyo)
 - Power supply for servo system adjustment jig (Dual power supply specifications can be set to ± 5 V)
 - Audio system measurement inspection equipment
1. AC voltmeter (Minimum input sensitivity: 0.01 mV)
A meter with a sine wave correction, average value indication effective value scale. This input impedance is to be 1 M Ω or greater and the input capacitance 20 pF or less.
 2. Distortion meter (Minimum 0.1% THD measurement range)
 3. 20 kHz low-pass filter (EIAJ) specified by Sanyo
 4. Specified load resistors
PHONES jack: Connect 16 Ω $\pm 5\%$, 1/2 W or greater
LINE OUT jack: Connect 10 k Ω $\pm 5\%$, 1/8 W or greater
 5. Specified disc: TGYS1- MD AUDIO TEST 1 (SONY)

List of Adjustment Locations

Prior to each adjustment, the initial setting position of the potentiometer is to be at the mechanical center position.

| Location | Name | Adjustment Item |
|----------|--------|--------------------------------|
| VR101 | DCV1 | DC/DC 4.7 V adjustment |
| VR102 | DCV2 | DC/DC 5.0 V adjustment |
| VR201 | FOFF | Focus Offset adjustment |
| VR202 | FOK | ABCD (FOK) Offset adjustment |
| VR203 | E/F | CD disc E/F Balance adjustment |
| VR205 | TOFF | Tracking Offset adjustment |
| VR206 | MOTOFF | MO disc E/F Balance adjustment |
| VR207 | FBIA | Focus Bias adjustment |
| VR301 | TG | Tracking Gain adjustment |
| VR302 | FG | Focus Servo Gain adjustment |

Adjustment of Individual Boards

- Make the Following Connections and Checks Between Test Points Before Making Adjustments.
1. Connect TP307 (TAOI) and TP305 (TAOO). --- JPT
 2. Connect TP308 (FEOI) and TP304 (FEOO). --- JPF
 3. Apply an external power supply (5.7 V) to the EXT DC terminal and check that the current does not exceed 1 A. (500 mA average)

DC/ 4.7 V DC Adjustment

1. Connect a DC voltmeter (or tester) between TP111 (DCV1) and ground, then adjust VR101 (DCV1) so that the voltage becomes 4.7 V. Next, connect a DC voltmeter to TP207 (VC) and check that the voltage is half the value of the voltage of TP111 (DCV1).

DC/ 5.0 V DC Adjustment

1. Connect a DC voltmeter (or tester) between TP112 (DCV2) and ground, then adjust VR102 (DCV2) so that the voltage becomes 5.0 V.

ADJUSTMENTS FOLLOWING THE CONNECTION OF THE MECHANISM AND BOARD

Precautions Prior to Making Adjustments

Check that the shorting pattern of the Laser Diode of the MD Pickup FPC has been soldered, then connect the mechanism and the board.

After making the connection, remove the solder of the shorting pattern.

(Be sure to do this since the Laser Diode of the MD Pickup is susceptible to destruction.)

Shorting pattern



Adjustment Preparations

1. Short the TP603 (TEST) and TP602 (GND) to set the TEST mode of the microprocessor.
2. After switching on the power, check that the current flow is normal (i.e., less than 1 A.)
3. Press the STOP button to stop the unit.

FOK Offset Adjustment

1. Connect an oscilloscope between TP207 (VC) and TP204 (ABCD) and adjust VR202 (FOK) so that the FOK OFFSET is kept within a range of ± 10 mV.

Focus Bias Adjustment

1. Connect an oscilloscope between TP207 (VC) and TP206 (FBIA) and adjust VR207 (FBIA) so that the FOCUS BIAS is kept within a range of ± 10 mV.

Focus Offset Adjustment

(Be sure to make this adjustment after the Focus Bias Adjustment.)

1. Connect an oscilloscope between TP207 (VC) and TP302 (FE) and adjust VR201 (FOFST) so that the FOCUS OFFSET is kept within a range of ± 10 mV.

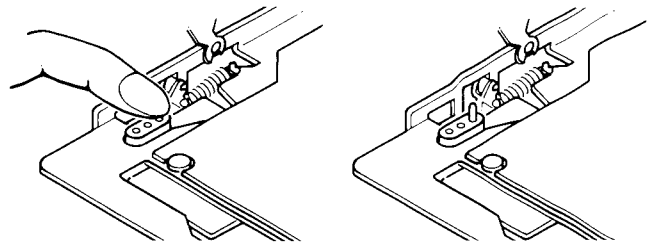
Tracking Offset Adjustment

1. Connect an oscilloscope between TP207 (VC) and TP301 (TE) and adjust VR205 (TOFF) so that the TRACKING OFFSET is kept within a range of ± 10 mV.

Laser Power Check

1. Make sure a disc is not loaded. Press the STOP button, then press the PLAY button.
2. Set a laser power meter at the lens of the MD Pickup.
3. Check that the laser power is within the following range.
When the mechanism switch is pressed (OFF):
0.2 mW to 0.4 mW
When the mechanism switch is free (ON):
0.4 mW to 0.6 mW

Mechanism Switch Position



Switch is Pressed (OFF)

Switch is Free (ON)

4. After the measurement, press the STOP button to stop the unit.

Method of Checking

(When a Laser Power Meter is not available)

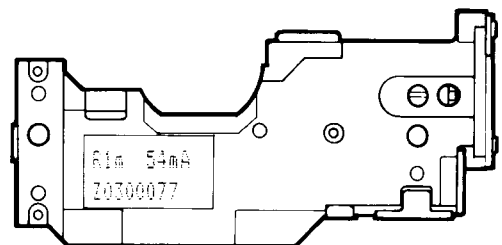
- The MD Pickup can be judged to be good or faulty using a tester.

1. Connect the tester (Set to the 1 V voltage range) between test point **IOP** and **IOP1** and measure the voltage value.

$$\text{Voltage value (V)} / 10 \Omega = \text{Current value (mA)}$$

2. When the measured value of the voltage is 0.5 V, the current value will be 50 mA.
If this current value is the same as the current value of the indication label affixed to the back of the MD Pickup, the MD Pickup is in good condition.
When the current value is quite high (e.g., 10 mA greater than the indicated value), the MD Pickup might be faulty.

Indication Example: R1m 54 mA (MO)



Position of Label on Back of MD Pickup

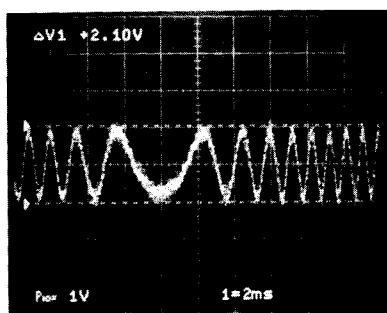
ADJUSTMENTS AND CHECKS USING MD SOFTWARE (CD/Pit)

Before Checking and Adjusting

1. Short the TP603 (TEST) and TP602 (GND) to set the TEST mode of the microprocessor.
2. Apply an external power supply (5.7 V) to the EXT DC terminal and check that the current does not exceed 1 A. (500 mA average)
3. Press the STOP button to stop the unit, then load the MD Software (CD/PIT disc).
4. Press the PLAY button and check that the LCD is displaying "FOCUS LOW" ↔ "FOCUS HIGH". If "FOCUS HIGH" is displayed momentarily, it signifies that there is reflection from the disc and that the operation is normal.
5. Next, lightly press the FF button and the FB button. Check that the MD Pickup moves in each of the directions, toward the outer tracks and also toward the inner tracks. Following this, make the MD Pickup move to the vicinity of the center of the disc.
6. Press the SET button and check that the LCD displays "FOCUS ON".
Next, pressing the MODE button will cause the LCD to display "CLV PIT → CLVA/TON".
Press the SET button again at this point to display "CLVA/TOFF".

E/F Balance Adjustment (CD/Pit Disc)

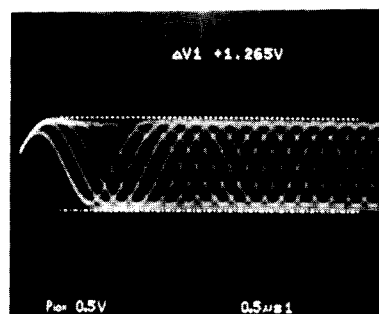
1. While in this condition, connect an oscilloscope between TP207 (VC) and TP301 (TE) and adjust VR203 (E/F) so that the tracking error waveform (TE signal) is symmetrical about the 0-V center.
At this time, check that the peak-to-peak voltage of the TE level is in the range of 1.8 V to 3.2 V.



Waveform 1 CD/PIT TE

HF Level and Jitter Value Check

1. While in this condition, connect an oscilloscope between TP207 (VC) and TP210 (RF2). Press the SET button while viewing the waveform of the eye pattern and switch on the tracking servo. (CLVA/TON)
2. Next, check that the jitter value at TP210 (RF2) is between 16 and 27 ns; also check that the peak-to-peak value of the HF level at this time is in the range of 1.0 V to 1.5 V.

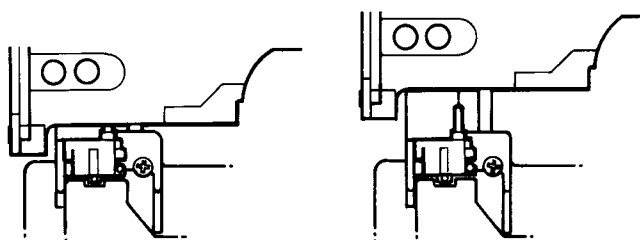


Waveform 2 CD/PIT HF

Reference

In the TEST mode of the microprocessor, at the time of TOC read, the mechanical position at which the inner track switch of the mechanism is switched on is displayed in hexadecimal.

Inner Track Switch Position



Switch is Pressed (ON)

Switch is Free (OFF)

Example of the indication: FFAC05-10 FF8A15

If the underlined values above are FF or less, the position of the inner track switch of the mechanism can be regarded as normal.

This check can be executed by pressing the RESET switch in the TEST mode.

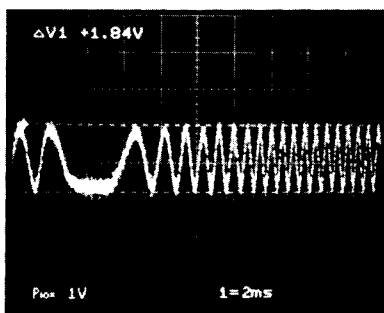
ADJUSTMENTS AND CHECKS USING RECORDABLE MD (MO/Pit)

Before Checking and Adjusting

1. Short the TP603 (TEST) and TP602 (GND) to set the TEST mode of the microprocessor.
2. Apply an external power supply (5.7 V) to the EXT DC terminal and check that the current does not exceed 1 A. (500 mA average)
3. Press the STOP button to stop the unit, then load the disc (Recordable MD).
4. Press the PLAY button and check that the LCD is displaying "FOCUS LOW" ↔ "FOCUS HIGH". If "FOCUS HIGH" is displayed momentarily, it signifies that there is reflection from the disc and that the operation is normal.
5. Next, lightly press the FF button and the FB button. Check that the MD Pickup moves in each of the directions, toward the outer tracks and also toward the inner tracks. Following this, make the MD Pickup move to the innermost track position of the disc.
6. Press the SET button and check that the LCD displays "FOCUS ON".
7. Press the MODE button and check that the LCD displays "CLV/PIT".
8. When the rotation of the disc becomes irregular at this time, press the STOP button since the position of the MD Pickup is not at the innermost track. Perform the procedure again from Step 4.

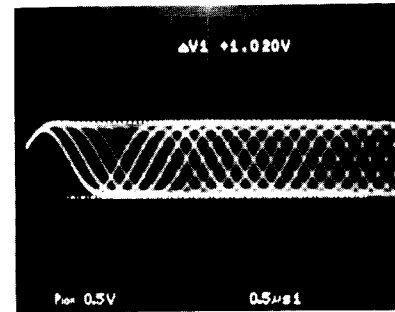
E/F Balance Adjustment (MO/Pit Portion)

1. Connect an oscilloscope between TP207 (VC) and TP301 (TE) and adjust VR205 (TOFF) so that the tracking error waveform (TE signal) is symmetrical about the 0-V center.
At this time, check that the peak-to-peak voltage of the TE level is in the range of 1.6 V to 2.6 V.



Waveform 3 MO/PIT TE

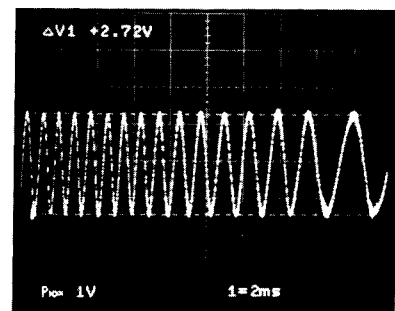
2. Press the MODE button and check that the LCD displays "CLVA/TON".
3. Next, connect an oscilloscope between TP207 (VC) and TP210 (RF2). Monitor the HF waveform and check that the peak-to-peak value of this level is in the range of 0.7 V to 1.4 V. Also check that the jitter value is from 16 to 27 ns.



Waveform 4 MO/PIT HF

E/F Balance Adjustment (MO/Groove Portion)

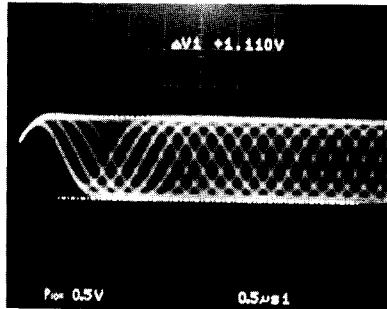
1. After adjusting the MO/PIT portion, press the STOP button, then press the FF button to move the MD Pickup to the center vicinity of the disc.
2. Press the PLAY button and check that the LCD is displaying "FOCUS LOW" ↔ "FOCUS HIGH". If "FOCUS HIGH" is displayed momentarily, it signifies that there is reflection from the disc and that the operation is normal.
3. Press the SET button and check that the LCD displays "FOCUS ON".
4. Next, press the MODE button to display "CLV PIT" on the LCD. Without leaving a further space, press the SET button to display "CLV/GROOV".
5. While in this condition, connect an oscilloscope between TP207 (VC) and TP301 (TE) and adjust VR206 (MOTOFF) so that the tracking error waveform (TE signal) is symmetrical about the 0 V center.



Waveform 5 MO/GRV TE

At this time, check that the peak-to-peak voltage of the TE level is in the range of 2.3 V to 3.5 V.

6. Press the MODE button, then press the SET button and check that the LCD displays "CLV/TON".
7. Next, connect an oscilloscope between TP207 (VC) and TP210 (RF2). Monitor the HF waveform and check that the peak-to-peak value of this level is in the range of 0.7 V to 1.4 V. Also check that the jitter value is from 21 to 27 ns.

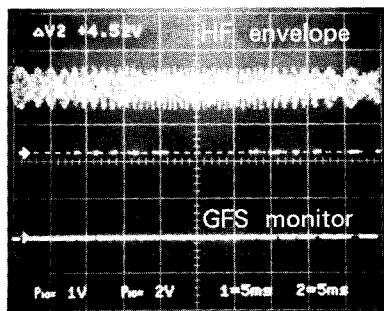


Waveform 6 MO/GRV HF

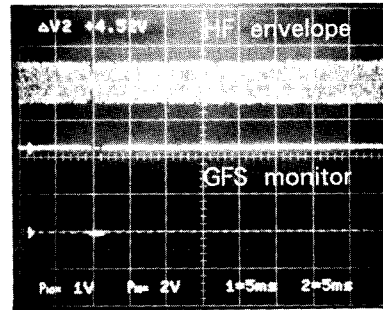
Reference

The PIT (EFM) servo is applied at the innermost track (read-in area) of the Recordable MD, whereas the servo is applied to the groove (ADIP) at the outside (UTOC area and program area).

This is judged to be OK provided that while monitoring the HF waveform, the waveform (envelope) exists in good form.



Waveform 7 Tracking Servo OFF



Waveform 8 Tracking Servo ON

With unrecorded discs the servo is applied only to the groove (ADIP). When the selection of PIT/GROOV is incorrect, the disc may rotate at high speed in the test mode. Should this occur, perform the procedure from the start again. To check the synchronization, monitoring is possible from test point "GFS" pattern of the board or with the HF waveform.

- Synchronized when GFS is high level.
- Not synchronized when GFS is low level.

Tracking and Focus Servo Gain Adjustments

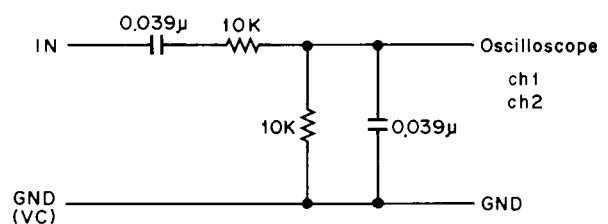
Prior to Adjustments:

1. Use the specified special playback MD (TGYS-1).
2. Make oscilloscope settings as follows.

(In the X-Y mode) Channel 1: 10 mV/div.

Channel 2: 10 mV/div.

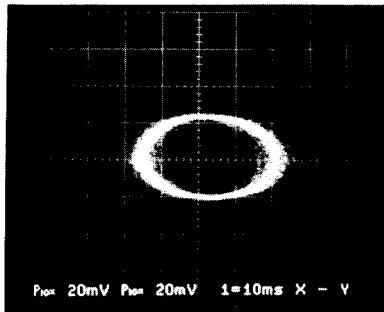
3. Filter jig for the oscilloscope input



Filter Circuit Diagram

Tracking Gain Adjustment

1. Disconnect the connections (JPT) of TP307 (TAOI) and TP305 (TAOO).
2. Connect "IN" of the measurement circuit jig to TP307 (TAOI), "OUT" of the jig to TP305 (TAOO), and "GND" of the jig to TP207 (VC), then set the unit to the play condition (TEST mode).
3. Set the frequency of the low-frequency oscillator (SG) which is input to the jig to 1.2 kHz and the input level to 60 mV.
4. Next, connect CH1 (X input) of the oscilloscope to the "SG" terminal of the jig, and CH2 (Y input) to the "IN" terminal of the jig. Set the mode of the oscilloscope to X-Y and trace a Lissajous figure. Adjust VR301 (TG) so that the waveform becomes circular (90° phase difference).

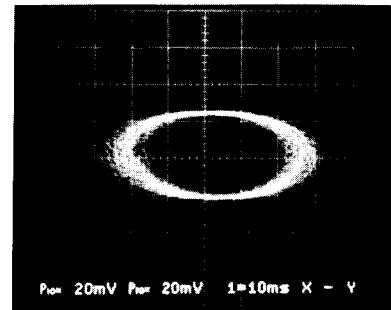


Waveform 9 Tracking Gain

5. After completing the adjustment, make the connections (JPF) of TP307 (TAOI) and TP305 (TAOO).

Focus Servo Gain Adjustment

1. Disconnect the connections (JPF) of TP308 (FEOI) and TP304 (FEOO).
2. Connect "IN" of the measurement circuit jig to TP308 (FEOI), "OUT" of the jig to TP304 (FEOO), and "GND" of the jig to TP207 (VC), then set the unit to the play condition (TEST mode).
3. Set the frequency of the low-frequency oscillator (SG) which is input to the jig to 1.2 kHz and the input level to 60 mV.
4. Next, connect CH1 (X input) of the oscilloscope to the "SG" terminal of the jig, and CH2 (Y input) to the "IN" terminal of the jig. Set the mode of the oscilloscope to X-Y and trace a Lissajous figure. Adjust VR302 (FG) so that the waveform becomes circular (90° phase difference).



Waveform 10 Focus Servo Gain

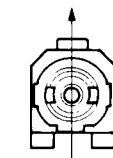
5. After completing the adjustment, make the connections (JPF) of TP308 (FEOI) and TP304 (FEOO).

Simple Adjustment Method

(Tracking Gain and Focus Servo Gain)

This adjustment is permitted by mechanically setting the potentiometer used for the adjustments. Set to the angles described below.

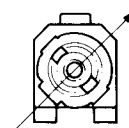
- Tracking Gain Adjustment (VR301)



(Set to 90°)

Mechanical center position

- Focus Servo Gain Adjustment (VR302)



(Set to 45°)

Before Checking and Adjusting

(Note that failure to perform the operations of this section may result in an overflow of current which can destroy the Laser Diode of the MD Pickup. Be sure to perform these operations.)

1. After the adjustment and the check, press the STOP button. Then, after switching off the power, remove TP603 (TEST) from ground to escape from the TEST mode of the microprocessor.

2. In circumstances such as this and during repairs when it becomes necessary to disconnect the flexible printed circuit of the MD Pickup, be sure to connect the shorting pattern of the Laser Diode with solder.
3. When the adjustment has been completed, check that JPF and JPT of the servo gain adjustment are connected by solder.

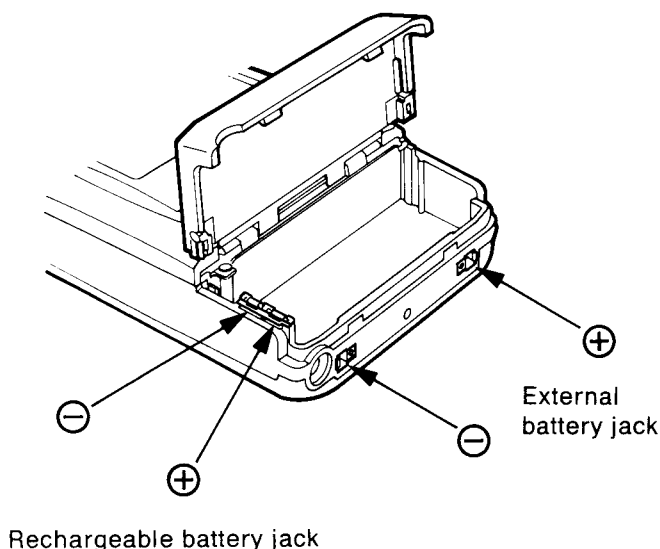
OPERATION CHECK

Normal Playback Test

1. Before the operation check, check that the shorting pattern used to protect the Laser Diode has been disconnected.
If this is not disconnected, a "NO DISC" indication will result even when a disc is loaded and an over-current will flow.
2. Connect an external power supply and play the disc. Make a check of the disc title, song title indications, line out, headphones, tone adjustment switch, and volume.
3. Disconnect the external power supply. Apply power from the rechargeable battery jack and check the operation. The voltage setting value is 3.6 V.
4. Apply power from the external battery jack and check the operation.
The voltage setting value is 4.5 V.

Precautions

Be sure that the polarity is correct when applying power from the battery jacks.



Characteristics of Reduced Voltage and Overvoltage

(When Using the External Power Jack)

1. Performance with Reduced voltage
When the voltage at the external jack of the unit is set at 5.4 V, the playback performance described below is to be satisfied.
2. Performance with Overvoltage
When the voltage at the external jack of the unit is set at 6.0 V, the playback performance described below is to be satisfied.

Play Performance

1. Search time
When a search between the inner track and outer track is conducted with the discs listed below, the search is to be completed within 5 seconds.
Use MD CD TGYS1
Use MD MO TYPE 15 (Copy of TGYS1)
2. Play start time
When the discs listed below are used, play is to start within 7 seconds of pressing the PLAY button.
Use MD CD TGYS1
Use MD MO TYPE 15 (Copy of TGYS1)

Reduced Voltage Operation Check

(Using Ni-Cd)

When using the Ni-Cd rechargeable batteries built into the unit, operation is to be as follows.

1. Flashing of the reduced voltage indication
The LCD reduced voltage indication (battery mark) is to flash with a power supply voltage between 3.53 V and 3.36 V.
2. Lighting of the reduced voltage indication
The LCD reduced voltage indication (battery mark) is to light with a power supply voltage between 3.38 V and 3.20 V.
3. Extinguishing of the reduced voltage indication
When the power supply voltage is raised while the reduced voltage indication (battery mark) is lit on the LCD, the reduced voltage indication (battery mark) on the LCD is to be extinguished when the voltage is between 3.54 V and 4.0 V.

4. Automatic stop when there is reduced voltage
When the power supply voltage is lowered while the reduced voltage indication is flashing or lit, "EMPTY" will be displayed between 3.27 V and 3.12 V and the unit will automatically stop.
5. Operation after a stop with the "EMPTY" display
After a stop with the "EMPTY" display, pressing the PLAY or MODE button with a voltage of 3.12 V to 3.53 V will cause "EMPTY" to be displayed and the unit will automatically stop.
Pressing the PLAY or MODE button with a voltage of 3.54 V to 4.5 V will result in entry to the access operation.
6. Alkaline battery operation
After a stop with the "EMPTY" display while using Ni-Cd batteries, when alkaline batteries are connected and the alkaline battery voltage is between 3.7 V and 4.0 V, pressing the PLAY or MODE button will result in entry to the access operation.

Rechargeable Operation Check

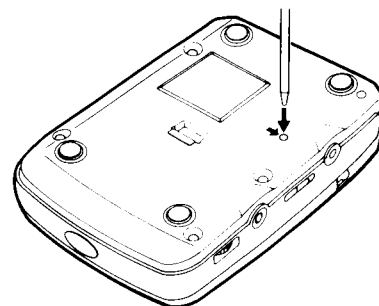
With the Ni-Cd rechargeable batteries inside the unit, and power being supplied from the external battery jack, the operation is to be as follows.

1. After power has been supplied, press the following buttons: PLAY → STOP → STOP to display "Battery Charging" on the LCD.
2. After several minutes, (a time which will vary depending on the voltage of the Ni-Cd rechargeable batteries), check that the LCD indication changes to "CHARGE RATE".

3. When the external power supply plug is disconnected from the external power supply jack while the charging indication is displayed, or when the Ni-Cd rechargeable battery is removed, the charging indication will be extinguished.

When the Unit Ceases to be Operable

1. When this unit is operated and all operations cease to function (and the buttons do not function), it is possible that the microprocessor is runaway. First check the input power supply voltage, then press the RESET switch located at the rear of the unit. This action will first cut the power, then the microprocessor will be reset.
An external DC power supply (AC adapter) should be used for this procedure. If this procedure is performed with a Ni-Cd rechargeable battery which has not been fully charged, there will be a voltage drop and it will not be possible to reset the microprocessor.



SPECIFICATIONS

| | |
|--|---|
| Type | MiniDisc digital audio system |
| Signal Reading Method | Non-contact optical pickup (using a semiconductor laser) |
| Laser | Ga-Al-As double heterodiode (780 nm wavelength) |
| Speed | Approximate 400 rpm ~ 900 rpm (CLV) |
| Error Correction | Advanced Cross Interleave Reed-Solomon Code (ACIRC) |
| Sampling Frequency | 44.1 kHz |
| Modulation | EFM |
| Number of Channels | 2 (stereo) |
| Frequency Response (± 3 dB) | 20 Hz ~ 20 kHz |
| Wow and Flutter | Below measurable limits |
| Output Terminals | |
| PHONES Jack (maximum output) | 10 mW + 10 mW (16 Ω) |
| LINE OUT Jack (rated output) | 0.7 Vrms (10 k Ω) |
| Power Supply | |
| AC Adaptor | 230 V/50 Hz |
| DC | 3.6V: Using the rechargeable nickel-cadmium battery (NBP-MDGP1) (supplied) |
| | 4.5V: Using three AA alkaline batteries (not supplied), loaded in the supplied AA battery case, together with the rechargeable nickel-cadmium battery |
| Dimensions (Approximate) (W x H x D) | 87 x 35 x 132 mm |
| Weight (Approximate) | 430 g (including rechargeable nickel-cadmium battery) |

Specifications and design are subject to change without notice.

AUDIO CHARACTERISTICS

Audio Characteristics (Value at LINE OUT Jack)

| NO | ITEM | CONDITIONS | NOMINAL | LIMIT |
|----|---|---|---------------------------------------|---|
| 1 | Output level | 1 kHz/0 dB | 700 mV | 700 mV \pm 2 dB |
| 2 | Difference in output level between channels | 1 kHz/0 dB | 0 dB | \pm 1 dB or less |
| 3 | Frequency response: 1 kHz/0 dB playback is the standard | 20 Hz/0 dB 100 Hz/0 dB 10 kHz/0 dB 20 kHz/0 dB | -0.5 dB 0 dB -0.2 dB -1.0 dB | -0.5 dB \pm 3 dB 0 dB \pm 3 dB -0.2 dB \pm 3 dB -1.0 dB \pm 3 dB |
| 4 | De-emphasis characteristics: 1 kHz/0 dB playback is the standard | 5 kHz/0 dB 16 kHz/0 dB | -4.5 dB -9.5 dB | -4.5 dB \pm 2 dB -9.5 dB \pm 3 dB |
| 5 | Separation: 1 kHz/0 dB playback is the standard; IHF-A | 1 kHz/0 dB | 78 dB | 70 dB or greater |
| 6 | Harmonic distortion factor: 1 kHz/0 dB playback is the standard | 1 kHz/0 dB | 0.07 % | 0.1 % or less |
| 7 | Signal-to-noise ratio: IHF-A | 1 kHz/0 dB | 100 dB | 85 dB or greater |

- A 20 kHz low-pass filter is used with items 5, 6, and 7.

Audio Characteristics (Value at Headphone Jack)

| NO | ITEM | | CONDITIONS | NOMINAL | LIMIT |
|----|--|---|--|--|--|
| 1 | Maximum output: 5% THD | | 1 kHz/0 dB | 9 mW | 8 mW or greater |
| 2 | Difference in output level between channels: Volume control is set to center position | | 1 kHz/0 dB | \pm 0.5 dB | \pm 2.0 dB or less |
| 3 | Frequency response: Volume control is set to center position 1 kHz/0 dB playback is the standard | | 40 kHz/0 dB 100 Hz/0 dB 10 kHz/0 dB 20 kHz/0 dB | -1.5 dB -0.5 dB -0.5 dB -1.5 dB | -1.5 dB \pm 3 dB -0.5 dB \pm 3 dB -0.5 dB \pm 3 dB -1.5 dB \pm 3 dB |
| 4 | Separation: Output adjusted to 5 mW/channel IHF-A | | 1 kHz/0 dB | 37 dB | 34 dB or greater |
| 5 | Harmonic distortion factor: Output adjusted to 5 mW/channel | | 1 kHz/0 dB | 0.1 % | 0.3 % or less |
| 6 | Signal-to-noise ratio: IHF-A | | 1 kHz/0 dB | 90 dB | 85 dB or greater |
| 7 | S.E.S. : Flat / B / A Output adjusted to 40 mV/channel | A | 100 Hz/0 dB 10 kHz/0 dB | 12 dB 4 dB | 12 dB \pm 3 dB 4 dB \pm 2 dB |
| | | B | 100 Hz/0 dB 10 kHz/0 dB | 8 dB 4 dB | 8 dB \pm 2 dB 4 dB \pm 2 dB |

- Volume conditions: "Maximum" unless otherwise specified.
- A 20 kHz low-pass filter is used with items 4, 5, and 6.

IC PIN VOLTAGE AND DESCRIPTION

IC101 CXA1381Q (RF Matrix Amplifier)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|---------|--|
| 1 | 2.32 | VR | (Vcc + VEE)/2 voltage pins |
| 2 | 2.32 | VC | At time of \pm power supply : Ground At time of single power supply : Connect to pin 1 |
| 3 | 2.13 | RF1 | Input pin of I-V converted RF signal 1 (I) |
| 4 | 2.12 | RF2 | Input pin of I-V converted RF signal 2 (J) |
| 5 | 2.22 | - B | Input pin of I-V converted main beam servo signal B |
| 6 | 2.2 | - A | Input pin of I-V converted main beam servo signal A |
| 7 | 2.21 | - D | Input pin of I-V converted main beam servo signal D |
| 8 | 2.22 | - C | Input pin of I-V converted main beam servo signal C |
| 9 | 2.26 | - E | Input pin of I-V converted side beam servo signal E |
| 10 | 2.26 | - F | Input pin of I-V converted side beam servo signal F |
| 11 | 2.31 | TOFST | Tracking error offset adjustment pin |
| 12 | 2.33 | ACT1 | Main beam push-pull signal output (ADIP signal) |
| 13 | 2.31 | ACT2 | AGC input for ADIP signal; connect ACT1 with AC coupling |
| 14 | 2.93 | APCDET | Connect a photodiode, I-V convert with a resistor; detects the light volume |
| 15 | 2.36 | LDO | LD amplifier output pin of the APC |
| 16 | 2.93 | LD | Inverting input pin of the LD amplifier |
| 17 | 2.32 | TEMPI | Temperature sensor connection pin |
| 18 | 2.33 | TEMPO | Output pin of the temperature signal |
| 19 | 0 | VEE | At time of \pm power supply : Negative power supply At time of single power supply : Ground |
| 20 | 2.99 | APCREF | Laser power setting input pin |
| 21 | 2.38 | ADIPFM | ADIP FM signal output pin |
| 22 | 2.28 | FE | Focus error signal output pin |
| 23 | 2.3 | FBIAS | Focus bias adjustment input pin |
| 24 | 2.25 ~ 2.32 | TE | Tracking error signal output pin |
| 25 | 0.09 ~ 0.1 | TCOUNT | Tracking count signal output pin |
| 26 | 1.88 | CB | Defect peak hold capacitor connection pin |
| 27 | 0.05 | DFCT | Defect comparator output pin (Defect at "H") |
| 28 | 2.48 | CC | AC coupling input pin of the defect peak hold signal |
| 29 | 2.51 | PKHLD | Defect peak hold output pin |
| 30 | 0.09 ~ 0.1 | OFTRK | Off track signal output pin (Off track at "H") |
| 31 | 4.63 | VCC | Power supply pin |
| 32 | 2.34 | OFTIN | Light volume signal AC coupling input pin for off tracking detection |
| 33 | 3.3 | ABCD | Light volume signal output pin of the main beam servo detector |
| 34 | 3.29 | AGCIN | Input pin for AGC control |
| 35 | 4.61 | FOK | Focus OK signal output pin (Focus OK at "H") |
| 36 | 4.43 | REFLECT | Judgment signal for disc reflection ratio (High reflection ratio at "H" and low reflection ratio at "L") |
| 37 | 4.42 | RFSW0 | Disc mode switching signal input pin (High reflection ratio at "H" and low reflection ratio at "L") |
| 38 | 4.39 | RFSW1 | Disc mode switching signal input pin (Pit at "H" and groove at "L") |
| 39 | 1.36 | CP | MIRR hold capacitor connection pin |
| 40 | 2.31 | ASY | Auto asymmetry control input pin |
| 41 | 0 | D.GND | Ground pin (Digital system) |
| 42 | 2.29 | EFM | EFM comparator output pin |
| 43 | 0 | VEE | At time of \pm power supply : Negative power supply At time of single power supply : Ground |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|---------|--|
| 44 | 2.3 | RFI | Equalizer output of AC coupling input pin |
| 45 | 2.22 | RFO | Equalizer output pin (Eye pattern check point) |
| 46 | 1.4 | EQ | External resistor connection pin for the equalizer |
| 47 | 2.2 | FOKOFST | Offset adjustment pin for ABCD amplifier |
| 48 | 2.28 | FOST | Offset adjustment pin for focus error amplifier |

IC102 CXA1380M (Address In Pre-groove)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|---|
| 1 | 0.68 | FSET | VCO center frequency setting pin for the ADIP bit clock regenerator |
| 2 | 2.34 | VM | 1/2 VCC voltage output pin (Internal circuit bias voltage) |
| 3 | 2.38 | ADIPFM | Input pin of ADIP FM signal |
| 4 | 2.34 | BPFO | Output pin of band-pass filter |
| 5 | 2.32 | PC22KI | Input pin of FM demodulation phase comparator (Output of pin 4 is input with capacitive coupling) |
| 6 | 2.32 ~ 2.37 | PC22KO | Output pin of FM demodulation phase comparator |
| 7 | 2.24 ~ 2.27 | BUFI | PLL feedback pin for FM demodulation (Signal of pin 6 is input) |
| 8 | 2.29 ~ 2.32 | BUFO | Output pin of FM demodulation signal |
| 9 | 2.32 | LPFI | Input pin of low-pass filter (Output of pin 8 is input with capacitive coupling) |
| 10 | 0 | GND | Ground pin |
| 11 | 2.31 | LPFO | Output pin of low-pass filter |
| 12 | 2.31 | FMCOMP | Input pin of comparator for ADIP data (Output of pin 11 is input) |
| 13 | 0.68 | ISET | Internal circuit constants setting pin |
| 14 | 2.0 ~ 2.04 | FMDT | ADIP data output pin |
| 15 | 1.0 ~ 1.17 | EDGE | Edge detection signal output pin for ADIP data |
| 16 | 1.8 ~ 1.83 | FMCK | Output pin of ADIP bit clock |
| 17 | 2.21 ~ 2.27 | PC6KO | ADIP bit clock |
| 18 | 1.94 ~ 2.0 | LF3K | PLL feedback pin for ADIP bit clock regenerator |
| 19 | 2.0 ~ 2.08 | ADIPFG | Comparator output pin of ADIP FM data |
| 20 | 4.64 | VCC | Power supply pin |

IC103 CXA1602Q (Focus/Tracking Coil & Motor Servo Control)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------|---|
| 1 | 2.32 | VC | Mid point potential pin |
| 2 | 2.31 | FGD | Connects (against ground) the capacitor which determines the low region time constant |
| 3 | 2.44 | FCS BIAS | Reference voltage pin of the FZC comparator |
| 4 | 2.3 | FLB | Time constant external connection pin for raising the low region of the focus servo |
| 5 | 2.22 | FEO | Focus drive output pin |
| 6 | 2.32 | FE – | Inverted output of the focus amplifier |
| 7 | 2.63 | SRCH | Time constant external connection pin for creating the focus search waveform |
| 8 | 2.31 | TGU | Time constant external connection pin for tracking high region gain switching |
| 9 | 2.32 | TG2 | Time constant external connection pin for tracking high region gain switching |
| 10 | 4.63 | AVCC | Power supply pin (Analog system) |
| 11 | 2.32 ~ 2.35 | TAO | Tracking drive output |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 12 | 2.32 | TA – | Inverting input of the tracking amplifier |
| 13 | 2.3 ~ 2.4 | SL + | Non-inverting of the sled amplifier |
| 14 | 2.35 ~ 2.4 | SLO | Sled drive output |
| 15 | 2.32 ~ 2.33 | SL – | Inverting input of the sled amplifier |
| 16 | 4.61 | SSTOP | Limit switch on/off detection signal pin for detecting innermost track of disc |
| 17 | 0.76 | FSET | Setting pin for peak phase compensation of the focus tracking, and Fo of the CLV LPF. |
| 18 | 3.6 | SENS | Outputs FZC, AS, TZC, and SSTOP. |
| 19 | 0 | AVEE | Ground (Analog system) |
| 20 | 0.1 | COUT | Signal output for the number of tracks count |
| 21 | 4.6 | DIRC | Used at time of 1-track jump |
| 22 | 4.47 | XRST | Reset input pin (Reset at "L") |
| 23 | 4.6 | DATA | Serial data input from the CPU |
| 24 | 4.62 | XLT | Latch input from the CPU |
| 25 | 4.6 | CLK | Serial data transfer clock input from the CPU |
| 26 | 0 | DGND | Ground (Digital system) |
| 27 | 2.32 | BW | Time constant external connection pin for the loop filter |
| 28 | 2.32 | PDI | Pin for inputting the phase comparator output PDO |
| 29 | 2.14 | ISET | Supplies the current which determines the focus search, trac jump, and height of the sled kick |
| 30 | 2.22 | VOCF | The self running frequency of the VCO is roughly proportional to the resistance value between this pin and pins 31 and 37. |
| 31 | 3.43 | 3.5V | VCO power supply pin; voltage is applied externally |
| 32 | 2.06 | C864 | 8.64 MHz VCO output pin |
| 33 | 5.01 | LOCK | Sled runaway prevention circuit operates at "L" |
| 34 | 2.41 ~ 2.62 | MDP | Connected to the MDP pin of the CXD2500 |
| 35 | 4.58 | MON | Connected to the MON pin of the CXD2500 |
| 36 | 2.37 | FSW | LPF time constant external connection pin for the CLV servo error signal |
| 37 | 4.63 | DVCC | Power supply pin (Digital system) |
| 38 | 2.32 | SDPL – | Inverting input of the spindle drive amplifier |
| 39 | 2.5 | SPDLO | Spindle drive output |
| 40 | 2.3 | TDFCT | LPF capacitor connection pin for the tracking defect compensation circuit |
| 41 | 2.29 | FDFCT | LPF capacitor connection pin for the focus defect compensation circuit |
| 42 | 0.09 | MIRR | Mirror signal input pin |
| 43 | 0 | DVEE | Ground (Digital system) |
| 44 | 0.01 | DFCT | Defect compensation circuit operates at "H" |
| 45 | 2.32 | TE | Tracking error signal input pin |
| 46 | 2.31 | TZC | Input pin of the tracking zero cross comparator |
| 47 | 2.27 | ATSC | Window comparator input pin for ATSC detection |
| 48 | 2.31 | FE | Focus error signal input pin |

IC104 CXD2500BQ (Digital Signal Processor)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 1 | 4.61 | FOK | Focus OK input pin |
| 2 | 0.1 ~ 0.6 | FSW | Spindle motor output filter switching output |
| 3 | 4.58 | MON | Spindle motor on/off control output |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|---|
| 4 | 2.4 ~ 2.6 | MDP | Phase servo control of the spindle motor |
| 5 | 2.24 ~ 2.33 | MDS | Speed servo control of the spindle motor |
| 6 | 4.62 | LOCK | "H" output when GFS is "H"; "L" output when "L" 8 times in succession |
| 7 | | NC | |
| 8 | 2.31 | VCOO | Oscillation circuit output for the analog EFM PLL |
| 9 | 2.31 | VCOI | Oscillation circuit output for the analog EFM PLL |
| 10 | 0 | TEST | Test pin; normally grounded |
| 11 | 2.32 | PDO | Charge pump output for the analog EFM PLL |
| 12 | 0 | VSS | Ground |
| 13 | | NC | |
| 14 | | NC | |
| 15 | | NC | |
| 16 | 4.42 | VPCO | PLL charge pump output for variable pitch |
| 17 | 2.22 | VCKI | Clock input from external VCO for variable pitch is 16.9344 MHz |
| 18 | 2.25 | FILO | Filter output for master PLL |
| 19 | 2.28 | FILI | Input for master PLL |
| 20 | 2.27 | PCO | Charge pump output for master PLL |
| 21 | 0 | AVSS | Ground (Analog system) |
| 22 | 2.25 | CLTV | VCO control voltage input for master |
| 23 | 4.46 | AVDD | Power supply pin (Analog system) |
| 24 | 2.29 | RF | EFM signal input |
| 25 | 0 | BIAS | Asymmetry circuit fixed current input |
| 26 | 0 | ASYI | Asymmetry comparator voltage input |
| 27 | 2.29 | ASYO | EFM full swing output (VSS at "L", and VDD at "H") |
| 28 | 0 | ASYE | "L": Asymmetry circuit is off; "H": Asymmetry circuit is on |
| 29 | | NC | |
| 30 | 0 | PSSL | Audio data output mode switching input (Serial output at "L", and parallel output at "H") |
| 31 | 2.25 | WDCK | D/A interface for 48-bit usage; word clock frequency is 2fs |
| 32 | 0 | LRCK | D/A interface for 48-bit usage; LR clock frequency is fs |
| 33 | 4.63 | VDD | Power supply pin |
| 34 | 2.24 ~ 2.37 | DA16 | When PSSL equals 1, there is DA16 output; when PSSL equals 0, there is serial data of 48-bit slots. |
| 35 | 2.24 | DA15 | When PSSL equals 1, there is DA15 output; when PSSL equals 0, there is a bit clock of 48-bit slots. |
| 36 | 2.13 ~ 2.32 | DA14 | When PSSL equals 1, there is DA14 output; when PSSL equals 0, there is serial data of 64-bit slots. |
| 37 | 2.21 | DA13 | When PSSL equals 1, there is DA13 output; when PSSL equals 0, there is a bit clock of 64-bit slots. |
| 38 | 2.22 | DA12 | When PSSL equals 1, there is DA12 output; when PSSL equals 0, there is an LR clock of 64-bit slots. |
| 39 | 0.009 ~ 0.03 | DA11 | When PSSL equals 1, there is DA11 output; when PSSL equals 0, there is GTOP output. |
| 40 | 4.62 | DA10 | When PSSL equals 1, there is DA10 output; when PSSL equals 0, there is XUGF output. |
| 41 | 2.19 | DA09 | When PSSL equals 1, there is DA09 output; when PSSL equals 0, there is XPLCK output. |
| 42 | 4.59 | DA08 | When PSSL equals 1, there is DA08 output; when PSSL equals 0, there is GFS output. |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 43 | 2.31 | DA07 | When PSSL equals 1, there is DA07 output; when PSSL equals 0, there is RECK output. |
| 44 | 0.1 ~ 0.5 | DA06 | When PSSL equals 1, there is DA06 output; when PSSL equals 0, there is C2PO output. |
| 45 | 4.62 | DA05 | When PSSL equals 1, there is DA05 output; when PSSL equals 0, there is XRAOF output. |
| 46 | 4.11 | DA04 | When PSSL equals 1, there is DA04 output; when PSSL equals 0, there is MNT3 output. |
| 47 | 0.01 ~ 0.4 | DA03 | When PSSL equals 1, there is DA03 output; when PSSL equals 0, there is MNT2 output. |
| 48 | 0.01 ~ 0.4 | DA02 | When PSSL equals 1, there is DA02 output; when PSSL equals 0, there is MNT1 output. |
| 49 | 0.01 ~ 0.032 | DA01 | When PSSL equals 1, there is DA01 output; when PSSL equals 0, there is MNT0 output. |
| 50 | 1.13 | APTR | Control output for aperture correction; "H" for the right channel |
| 51 | 1.13 | APTL | Control output for aperture correction; "H" for the left channel |
| 52 | 0 | VSS | Ground pin |
| 53 | 2.18 | XTAI | 16.9344 MHz crystal oscillator circuit input |
| 54 | 2.18 | XTAO | 16.9344 MHz crystal oscillator circuit output |
| 55 | 0 | XTSL | Crystal selection input pin; "L" at 16.9344 MHz |
| 56 | 2.74 | FSTT | 2/3 division output of pins 53 and 54; does not change with variable pitch |
| 57 | 2.18 | C4M | 4.2336 MHz output; changes at same time with variable pitch |
| 58 | 1.53 | C16M | 16.9344 MHz output; changes at same time with variable pitch |
| 59 | 0 | MD2 | Digital-Out on/off control; on at "H", off at "L" |
| 60 | 0 | DOUT | Digital-Out output |
| 61 | 0 | EMPH | "H" output when played disc has emphasis, "L" output without. |
| 62 | 2.31 | WFCK | WFCK output |
| 63 | 0.06 | SCOR | "H" output when either sub code sync S0 or S1 is detected |
| 64 | 4.62 | SBSO | Serial output of sub P through W |
| 65 | 2.66 | EXCK | Clock input for SBSO readout |
| 66 | 3.4 | SQSO | Sub Q at 80 bit and PCM peak, Level data at 16 bit output |
| 67 | 4.43 | SQCK | Clock input for SQSO readout |
| 68 | 0 | MUTE | Muting at "H", cancelled at "L" |
| 69 | 0.07 ~ 3.3 | SENS | SENS output; output to the CPU |
| 70 | 4.47 | XRST | System reset; reset at "L" |
| 71 | 4.42 | DATA | Serial data input from the CPU |
| 72 | 4.44 | XLAT | Latch input from the CPU |
| 73 | 4.63 | VDD | Power supply pin |
| 74 | 4.4 | CLOK | Serial data transfer clock output from the CPU |
| 75 | 4.6 | SEIN | Sense input from SSP |
| 76 | 0.01 | CNIN | Count signal input for number of tracks jumped |
| 77 | 4.6 | DATO | Serial data output to SSP |
| 78 | 4.62 | XLTO | Serial data latch output to SSP |
| 79 | 4.61 | CLKO | Serial data transfer clock output to SSP |
| 80 | 0.09 ~ 0.11 | MIRR | Mirror signal input |

IC105 MPC1716AFU (4 CH. H Bridge Multi Function Controller)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------|--|
| 1 | 0.01 ~ 0.6 | Hin2 | Power supply connection pin to the H bridge output portion of channel 2 |
| 2 | -0.03 ~ 0.6 | HOut2 | H bridge output pin of channel 2 |
| 3 | 0.01 ~ 0.7 | FI in2 | Outputs the voltage applied to the H bridge |
| 4 | 3.92 ~ 3.94 | Vin12 | Power supply pins of channels 1 and 2 |
| 5 | 0.4 | FI in1 | Outputs the voltage applied to the H bridge |
| 6 | 0 | PERGND12 | Power supply ground pins of channels 1 and 2 |
| 7 | 0.02 | Hout1A | H bridge output pin of channel 1 |
| 8 | 0.31 | Hin1 | Power supply connection pin to the H bridge output portion of channel 1 |
| 9 | 0.29 | Hout1B | H bridge output pin of channel 1 |
| 10 | 3.82 | VOOUT | External Tr connection pin of the DC/DC converter for the VLG power supply |
| 11 | 0.07 | DTC | Sets the duty value (0 to 100%) of the Vout output |
| 12 | 1.54 | RF | Feedback resistor connection pin of the error amplifier of the DC/DC converter for VLG |
| 13 | 0.63 | INM | Inverting input pin of the error amplifier of the DC/DC converter for VLG |
| 14 | 0.63 | INP | Non inverting input pin of the error amplifier of the DC/DC converter for VLG |
| 15 | 0.62 | VB | Bias stabilizing capacitor connection pin of the error amplifier (VREF/2 output) |
| 16 | 3.95 | VD | Power switch output pin (On/off switching of Vin input voltage by PC) |
| 17 | 0 | SIGGND24 | Internal logic ground |
| 18 | 1.24 | VREF | Output pin of the 1.24 V reference voltage |
| 19 | 9.7 ~ 11.5 | VG | Power supply pin for the gate drive of the LDMOS output transistor |
| 20 | 0.9 | CG | Charge pump voltage raising capacitor connection pin |
| 21 | 2.02 | VCPU | Regulator output pin |
| 22 | 0.85 | COSC | Sawtooth wave output pin |
| 23 | 0.24 | SYNC | Clock input pin |
| 24 | 0 | PC | Power control pin (Standby at "H", IC startup at "L") |
| 25 | 0.045 ~ 0.08 | Hout4B | H bridge output pin of channel 4 |
| 26 | 0.06 ~ 0.16 | Hin4 | H bridge power supply connection pin of channel 4 |
| 27 | 0.05 ~ 0.09 | Hout4A | H bridge output pin of channel 4 |
| 28 | 0 | PWRGND34 | Power ground of channels 3 and 4 |
| 29 | 0.09 ~ 0.19 | FLin4 | Outputs the voltage applied to the H bridge |
| 30 | 3.94 | Vin3,4 | Power supply pin of channels 3 and 4 |
| 31 | 0.51 | FI in3 | Outputs the voltage applied to channel 3 |
| 32 | 0.46 | Hout3A | H bridge output pin of channel 3 |
| 33 | 0.68 ~ 0.73 | Hin3 | H bridge power supply connection pin of channel 3 |
| 34 | 0.02 | Hout3B | H bridge output pin of channel 3 |
| 35 | 0.7 | LIM23 | Controls the voltage value of the LC filter output of channels 2 and 3 |
| 36 | 2.34 | Err4 | Control input pin of channel 4 |
| 37 | 0.05 | Err3 | Control input pin of channel 3 |
| 38 | 4.65 | VLG | Power supply input pin of the motor control circuit |
| 39 | 0 | SIGGND13 | Ground pin of the internal logic system |
| 40 | 2.32 | VC | Motor control reference potential input pin |
| 41 | 0.07 | Err2 | Control input pin of channel 2 |
| 42 | 2.21 | Err1 | Control input pin of channel 1 |
| 43 | 4.65 | LIM14 | Controls the voltage of the LC filter output of channels 1 and 4 |
| 44 | 0.04 | Hout2B | H bridge output pin of channel 2 |

IC106 MB89625 (System Control Micom)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------|---|
| 1 | 5.0 | DI | CCB interface output pin |
| 2 | 5.0 | DO | CCB interface input pin |
| 3 | 0.063 ~ 0.08 | ALCON | Alkaline batteries voltage control pin "L" : OFF, "H" : ON |
| 4 | 3.85 | WCLV | CLV control "L" : Wob, "H" : EFM |
| 5 | 2.99 | KEY | Key input pin |
| 6 | 0 | NC | |
| 7 | 2.18 | AD VCC | NiCd battery voltage measurement pin |
| 8 | 0 | AD CHRG | NiCd battery voltage measurement pin |
| 9 | | NC | |
| 10 | 4.71 | CHRG CON | NiCd battery charging control pin |
| 11 | 4.45 | AVCC | Power supply pin |
| 12 | 3.05 | AD VREF | A/D converter reference voltage input pin |
| 13 | 0 | AVSS | Ground |
| 14 | 5.0 | INT0 | Connects to pin 22 (/INT) of LC89601 |
| 15 | 0.06 | INT1 | Connects to pin 63 (SCOR) of CXD2500 |
| 16 | 4.43 | INT2 | Wake up pin |
| 17 | 4.52 | INT3 | External DC power input |
| 18 | 4.42 | O/C | Open/close switch input |
| 19 | 4.44 | RST | Reset input pin |
| 20 | 0 | MOD0 | Ground |
| 21 | 0 | MOD1 | Ground |
| 22 | 1.57 | XO | Clock output pin |
| 23 | 1.66 | XI | Clock input pin (8.0 MHz) |
| 24 | 0 | VSS | Ground |
| 25 | 0 | P.CON | Power control pin (Off at "H" and on at "L") |
| 26 | 0 | LDC | Laser control pin (Off at "H" and on at "L") |
| 27 | 0 | MO/CD | Connects to pin 37 (RFSW0) of CXA1381 (L-Ref at "L" and H-Ref at "H") |
| 28 | 4.42 | PIT/GRV | Connects to pin 38 (RFSW1) of CXA1381 (Groove at "L" and pit at "H") |
| 29 | 4.44 | AGCTC | Connects to pin 34 (AGCIN) of CXA1381 (Other at "L" and play at "H") |
| 30 | 2.67 ~ 2.74 | RS | Connects to pin 1 (RS) of LCD controller LC7985N |
| 31 | 3.33 ~ 3.39 | R/W | Connects to pin 2 (R/W) of LCD controller LC7985N |
| 32 | 2.68 ~ 2.73 | E | Connects to pin 3 (E) of LCD controller LC7985N |
| 33 | 3.82 ~ 3.86 | DB7 | Connects to pin 4 (DB7) of LCD controller LC7985N |
| 34 | 2.23 ~ 2.31 | DB6 | Connects to pin 5 (DB6) of LCD controller LC7985N |
| 35 | 3.42 ~ 3.47 | DB5 | Connects to pin 6 (DB5) of LCD controller LC7985N |
| 36 | 1.33 ~ 1.39 | DB4 | Connects to pin 7 (DB4) of LCD controller LC7985N |
| 37 | 1.79 ~ 1.92 | DB3 | Connects to pin 8 (DB3) of LCD controller LC7985N |
| 38 | 1.5 ~ 1.68 | DB2 | Connects to pin 9 (DB2) of LCD controller LC7985N |
| 39 | 1.79 ~ 1.9 | DB1 | Connects to pin 10 (DB1) of LCD controller LC7985N |
| 40 | 1.7 ~ 1.86 | DB0 | Connects to pin 11 (DB0) of LCD controller LC7985N |
| 41 | 4.43 | CADDY | Caddy detection switch |
| 42 | 4.43 | LOW REFL | Low reference disc key (MD at "L" and CD at "H") |
| 43 | 0 | TEST2 | Ground |
| 44 | 4.44 | TEST | Test key (Test at "L" and normal at "H") |
| 45 | 0 | LCD CON | LCD power supply control pin |
| 46 | | NC | |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|---|
| 47 | 4.62 | FOK | Connects to pin 1 (FOK) of CXD2500 (OK at "L" and NG at "H") |
| 48 | 0.1 ~ 3.4 | SENS | Connects to pin 69 (SENS) of CXD2500 |
| 49 | 0 | VSS | Ground |
| 50 | 0 | MUTE | Muting control pin (Off at "L" and on at "H") |
| 51 | 4.44 | SQCK | Connects to pins 67 and 74 (SQCK/CLOCK) of CXD2500 |
| 52 | 4.6 | GFS | Connects to pin 42 (GFS) of CXD2500 (NG at "L" and OK at "H") |
| 53 | 3.5 ~ 4.6 | SQSO | Connects to pin 66 (SQSO) of CXD2500 |
| 54 | 0 | CRC | Connects to pin 61 (ADIPCRC) of LC89601 |
| 55 | 4.47 | XLAT | Connects to pin 72 (XLAT) of CXD2500 |
| 56 | 4.44 | VCC | Power supply pin |
| 57 | 4.44 | DATA | Connects to pin 71 (DATA) of CXD2500 |
| 58 | 4.45 | XRST | Reset output pin |
| 59 | 2.51 | R/L | Connects to pin 60 (R/L) of LC79600 |
| 60 | 0.01 | ERR | Connects to pin 58 (ERR) of LC79600 |
| 61 | 2.53 | SGP | Connects to pin 16 (SGP) of LC89601 |
| 62 | 0.06 ~ 0.13 | CE | CE output pin of the CCB interface |
| 63 | 4.43 | BUZZ | Buzzer output pin for key and alarm use |
| 64 | 5.0 | CL | CL output pin for the CCB interface |

IC107 LC89601 (Anti-Shock Control)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------|---|
| 1 | 0 | VSS | Ground |
| 2 | 1.66 | CLKI | System clock input (16.9344 MHz) |
| 3 | 0.12 ~ 0.14 | SDO_0 | Outputs the sound block data |
| 4 | 0.13 ~ 0.15 | SDO_1 | Outputs the sound block data |
| 5 | 4.78 | SDO_2 | Outputs the sound block data |
| 6 | 4.77 | SDO_3 | Outputs the sound block data |
| 7 | 0.15 | SDO_4 | Outputs the sound block data |
| 8 | 4.8 | SDO_5 | Outputs the sound block data |
| 9 | 0.12 ~ 0.14 | SDO_6 | Outputs the sound block data |
| 10 | 4.78 | SDO_7 | Outputs the sound block data |
| 11 | 4.96 | SWR | Outputs the reception timing signal of the sound block data. |
| 12 | 4.65 | SACK | Indicates that the sound block data is being output. |
| 13 | 0 | VSS | Ground |
| 14 | 0 | SEPF OUT | Indicates that there is no longer sound block data to be transferred. |
| 15 | 4.65 | SREQ | Inputs the request signal for the sound block data. |
| 16 | 2.53 | SGP | Inverts with each sound group to be transferred. |
| 17 | 5.0 | CL | Clock for the CPU interface |
| 18 | 0.06 ~ 0.12 | CE | Chip enable for the CPU interface |
| 19 | 5.0 | DI | Data input for the CPU interface |
| 20 | 5.0 | DO | Data output for the CPU interface |
| 21 | 5.0 | CCB | Sets the CPU interface system |
| 22 | 5.0 | INT | Interrupt output for the CPU interface |
| 23 | 4.47 | RESET | System reset |
| 24 | 5.0 | PULLSW | Pull up resistor built into pin 48 through 51 used when value is "1". |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------|--|
| 25 | 0 | DATAO | Outputs descrambled data |
| 26 | 0 | C2POO | Outputs the C2 pointer of descrambled data |
| 27 | 5.0 | BCKO | Outputs 48 Fs (2.1168 MHz) |
| 28 | 0 | TEST1 | Test input pin (Fixed to VDD) |
| 29 | 5.0 | T0 | Test output pin |
| 30 | 5.0 | T1 | Test output pin |
| 31 | 5.0 | VDD | Power supply pin |
| 32 | 5.0 | T2 | Test output pin |
| 33 | 0 | T3 | Test input pin |
| 34 | 0 | T4 | Test input pin |
| 35 | 0 | T5 | Test input pin |
| 36 | 0 | T6 | Test input pin |
| 37 | 0 | T7 | Test input pin |
| 38 | 0 | T8 | Test input pin |
| 39 | 0 | T9 | Test input pin |
| 40 | 0 | T10 | Test input pin |
| 41 | 4.94 | MCAS | Outputs the CAS signal to external memory |
| 42 | 4.96 | MOE | Outputs the OE signal to external memory |
| 43 | 0.4 ~ 2.8 | MAD8 | Outputs the address signal to external memory |
| 44 | 0.4 ~ 2.6 | MAD7 | Outputs the address signal to external memory |
| 45 | 2.8 ~ 3.6 | MAD6 | Outputs the address signal to external memory |
| 46 | 1.0 ~ 2.6 | MAD5 | Outputs the address signal to external memory |
| 47 | 1.4 ~ 2.6 | MAD4 | Outputs the address signal to external memory |
| 48 | 1.4 ~ 2.5 | MAD3 | Outputs the address signal to external memory |
| 49 | 2.8 ~ 3.8 | MAD2 | Outputs the address signal to external memory |
| 50 | 1.9 ~ 2.5 | MAD1 | Outputs the address signal to external memory |
| 51 | 2.9 ~ 3.4 | MAD0 | Outputs the address signal to external memory |
| 52 | 0 | VSS | Ground |
| 53 | 0.4 ~ 3.1 | MAD9 | Outputs the address signal to external memory |
| 54 | 4.3 ~ 4.8 | MRAS | Outputs the RAS signal to external memory |
| 55 | 4.83 ~ 5.0 | MWE | Outputs the WE signal to external memory |
| 56 | 4.3 ~ 4.95 | MD1 | Sends and receives data between external memory |
| 57 | 4.2 ~ 4.93 | MD0 | Sends and receives data between external memory |
| 58 | 4.2 ~ 4.93 | MD3 | Sends and receives data between external memory |
| 59 | 4.1 ~ 4.93 | MD2 | Sends and receives data between external memory |
| 60 | 5.0 | ADIPSYNC | Indicates the ADIP sync timing |
| 61 | 0 | ADIPCRC | Indicates the CRC flag of the ADIP data |
| 62 | 5.0 | S/S | Selects the CLV servo signal and the type of data input |
| 63 | 5.0 | TEST2 | Test input pin (Fixed to VDD) |
| 64 | 5.0 | CLVSW | Selects whether the servo signal to be output is created internally or an external input |
| 65 | 1.79 ~ 1.82 | BICLKI | FM demodulates the warble signal and inputs the transfer clock of the obtained bi-phase data |
| 66 | 1.98 ~ 2.0 | BIDATAI | FM demodulates the warble signal and inputs the obtained bi-phase data |
| 67 | 2.0 | ADIPCRI | Indicates the CRC flag of the ADIP data |
| 68 | 1.97 ~ 2.0 | TEST3 | Test input pin (Fixed to VDD) |
| 69 | 0 ~ 0.55 | C2POI | Inputs the C2 pointer from the CD decoder |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 70 | 2.31 | RFCKI | Inputs the read frame clock (Fs/6) from the CD decoder |
| 71 | 2.24 ~ 2.35 | DATAI | Inputs the decode data from the CD decoder |
| 72 | 2.28 | LRCKI | Inputs the LR clock (Fs) from the CD decoder |
| 73 | 5.0 | VDD | Power supply pin |
| 74 | 4.62 | LOCKI | Outputs the lock signal |
| 75 | 2.25 ~ 2.35 | MDSI | Inputs the CLV signal from the CD decoder |
| 76 | 2.46 ~ 2.6 | MDPI | Inputs the CLV signal from the CD decoder |
| 77 | 2.45 ~ 2.6 | MDPO | Outputs the CLV servo signal |
| 78 | 2.24 ~ 2.32 | MDSO | Outputs the CLV servo signal |
| 79 | 2.37 | IMDSO | Outputs the CLV servo signal |
| 80 | 5.0 | LOCKO | Outputs the lock signal |

IC108 LC89600 (Adaptive TRansform Acoustic Coding)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 1 | 5.0 | DVDD | Power supply pin |
| 32 | 5.0 | DVDD | Power supply pin |
| 33 | 0 | VSS | Ground pin |
| 35 | 1.65 | CLKI | System clock input pin |
| 37 | 0 | BDOUT | Serial audio data output B pin |
| 39 | 1.82 ~ 1.87 | ADOUT | Serial audio data output A pin |
| 41 | 2.46 | LRCKO | LR clock output pin |
| 42 | 2.44 | WDCO | Word clock output pin |
| 44 | 2.42 | BCO | Bit clock output pin |
| 45 | 0 | ENH | De-emphasis output pin |
| 47 | 5.0 | CCB | CPU interface system specification input pin |
| 48 | 0 | VSS | Ground pin |
| 49 | 5.0 | VDD | Power supply pin |
| 52 | 0.27 | DPLAY | Play instruction input pin ("L" when not used) |
| 53 | 4.98 | DPAUSE | Stop instruction input pin ("H" when not used) |
| 55 | 0 | TP1 | Test output pin (Connected to ground) |
| 56 | 0 | TP0 | Test input pin |
| 58 | 0 | ERR | Error display output pin |
| 60 | 2.51 | L/R | Sound block clock output pin |
| 61 | 2.23 | SYNC | Sound frame clock output pin |
| 63 | 4.48 | RESET | Reset input pin |
| 64 | 0 | VSS | Ground pin |
| 65 | 5.0 | VDD | Power supply pin |
| 96 | 5.0 | VDD | Power supply pin |
| 97 | 0 | VSS | Ground pin |
| 100 | 5.0 | DO | Data output pin for the CPU interface |
| 102 | 5.0 | DI | Data input pin for the CPU interface |
| 103 | 0.06 ~ 0.1 | CE | Chip enable input pin for the CPU interface |
| 104 | 5.0 | CL | Clock input pin for the CPU interface |
| 106 | 4.65 | SREQB | Sound block data request output pin |
| 107 | 0 | SEPF | Sound block data empty flag input pin |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 109 | 4.66 | SACKB | Sound block data acknowledge input pin |
| 111 | 4.96 | SWRB | Sound block data write clock input pin |
| 113 | 5.0 | VDD | Power supply pin |
| 114 | 0 | VSS | Ground pin |
| 116 | 4.79 | SDIN7 | Sound block data input pin |
| 117 | 0.13 | SDIN6 | Sound block data input pin |
| 119 | 4.84 | SDIN5 | Sound block data input pin |
| 120 | 0.12 ~ 0.16 | SDIN4 | Sound block data input pin |
| 122 | 4.8 | SDIN3 | Sound block data input pin |
| 123 | 4.8 | SDIN2 | Sound block data input pin |
| 125 | 0.17 ~ 0.18 | SDIN1 | Sound block data input pin |
| 127 | 0.13 | SDIN0 | Sound block data input pin |
| 128 | 0 | VSS | Ground pin |

IC109 MSM514400AL (4M DRAM)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|-----------------------|
| 1 | 4.3 ~ 4.9 | DQ1 | Data input/output |
| 2 | 4.4 ~ 4.95 | DQ2 | Data input/output |
| 3 | 4.8 ~ 5.0 | WE | Write enable |
| 4 | 4.4 ~ 4.9 | RAS | Row address strobe |
| 5 | 0.4 ~ 3.1 | A9 | Address input/output |
| 9 | 2.9 ~ 3.4 | A0 | Address input 0 |
| 10 | 1.9 ~ 2.5 | A1 | Address input 1 |
| 11 | 2.7 ~ 3.8 | A2 | Address input 2 |
| 12 | 1.4 ~ 2.6 | A3 | Address input 3 |
| 13 | 5.0 | VCC | Power supply pin |
| 14 | 1.4 ~ 2.5 | A4 | Address input 4 |
| 15 | 1.0 ~ 2.5 | A5 | Address input 5 |
| 16 | 2.4 ~ 5.0 | A6 | Address input 6 |
| 17 | 0.4 ~ 2.6 | A7 | Address input 7 |
| 18 | 0.4 ~ 2.8 | A8 | Address input 8 |
| 22 | 4.96 | CE | Output enable |
| 23 | 4.7 ~ 4.94 | CAS | Column address strobe |
| 24 | 4.2 ~ 4.94 | DQ3 | Data input/output |
| 25 | 4.2 ~ 4.93 | DQ4 | Data input/output |
| 26 | 0 | VSS | Ground pin |

IC110 LC78835MF (18 Bit Digital Filter & 18 Bit D/A Converter)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 1 | 3.52 | REFH | Reference voltage "H" pin |
| 2 | 4.51 | VREF | Reference voltage "H" input pin |
| 3 | 0 | MUTE | Muting signal input pin (Software muting on at "H") |
| 4 | 0 | D/N | Operation mode switching pin (High speed at "H" and standard operation at "L") |
| 5 | 2.45 | BCLK | Bit clock input pin |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 6 | 1.81 ~ 1.86 | DATA | Digital audio data input pin |
| 7 | 2.46 | LRCK | LR clock input pin (Output of channel 1 at "H" and channel 2 at "L") |
| 8 | 4.63 | DVDD | Power supply pin (Digital system) |
| 9 | 2.21 | CKOUT | Clock output pin (At 392 Fs: 196 Fs clock; at a clock other than 392 Fs: clock of the XIN frequency) |
| 10 | 2.19 | XOUT | Crystal oscillator output pin (System clock output pin) |
| 11 | 2.22 | XIN | Crystal oscillator input pin (System clock input pin) |
| 12 | 0 | DGND | Ground pin (Digital system) |
| 13 | 4.47 | INITB | Initialization signal input pin (Initialization at "L") |
| 14 | 0 | EMP | De-emphasis filter on/off switching pin (On at "H" and off at "L") |
| 15 | 0 | FS1 | Mode switching pin of the de-emphasis filter 32 kHz, 44.1 kHz, and 48 kHz modes. (With FS1: "H" and FS2: "L", Fs = 44.1 kHz) |
| 16 | 0 | FS2 | Mode switching pin of the de-emphasis filter 32 kHz, 44.1 kHz, and 48 kHz modes. (With FS1: "H" and FS2: "L", Fs = 44.1 kHz) |
| 17 | 0 | CKSL1 | System clock selection pin (With CKSL1: "H" and CKSL2: "L", the system clock is 384 Fs) |
| 18 | 0 | CKSL2 | System clock selection pin (With CKSL1: "H" and CKSL2: "L", the system clock is 384 Fs) |
| 19 | 0 | VREFL | Reference voltage "L" input pin |
| 20 | 0.41 | REFL | Reference voltage pin |
| 21 | 1.97 | CH2OUT | Channel 2 analog output pin |
| 22 | 0 | AGND | Ground pin (Analog system) |
| 23 | 1.97 | CH1OUT | Channel 1 analog output pin |
| 24 | 4.51 | AVDD | Power supply pin (Analog system) |

IC111 BA3570FS (Headphone Driver)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|----------------|--------------------------------------|
| 1 | 0 | GND | Ground pin |
| 2 | 1.47 | LP IN | Low-pass filter input |
| 3 | 1.47 | IN 2 | Audio input pin 2 |
| 4 | 0 | NC | |
| 5 | 1.47 | HP 2 | High-pass filter 2 |
| 6 | 1.47 | LP NF | Low-pass filter NF |
| 7 | 1.46 | LP OUT | Low-pass filter output |
| 8 | 0.05 | ALS SW | Auto loudness switch |
| 9 | 0.07 | ALS SW τ | Auto loudness switch (Time constant) |
| 10 | 0 | ALS τ | Auto loudness (Time constant) |
| 11 | 1.25 | OUT 2 | Audio signal output pin 2 |
| 12 | 0 | PGND | Ground pin |
| 13 | 3.21 | VCC1 | Power supply pin 1 |
| 14 | 1.24 | OUT 1 | Audio signal output pin 1 |
| 15 | 3.21 | VCC 2 | Power supply pin 2 |
| 16 | 0.05 | MUTE SW | Muting switch |
| 17 | 0.63 | MUTE SW τ | Muting switch (Time constant) |
| 18 | 3.01 | FIL 2 | Ripple filter 2 |
| 19 | 3.03 | FIL 1 | Ripple filter 1 |
| 20 | 1.47 | HP 1 | High-pass filter 1 |

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--------------------------|
| 21 | 0 | NC | |
| 22 | 1.47 | IN 1 | Audio signal input pin 1 |
| 23 | 1.47 | BIN | Bias voltage input pin |
| 24 | 1.47 | BIAS | Bias voltage output pin |

IC112 MC34063A (DC-DC Converter)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|--|
| 1 | 3.88 | SW1 | Switch collector |
| 2 | 0 | SW2 | Switch emitter |
| 3 | 0.63 | TC | Timing capacitor connection pin |
| 4 | 0 | GND | Ground pin |
| 5 | 1.27 | FB | Comparator inverting input |
| 6 | 3.91 | VCC | Power supply pin |
| 7 | 3.89 ~ 3.92 | IPK | IPK detection pin |
| 8 | 3.64 ~ 3.68 | LIM | Connection pin for current value limiting resistor |

IC113 PQ05SZ11 (Regulator)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|-----------------|
| 1 | 5.5 | Vin | Input voltage |
| 2 | 5.0 | Vout | Output voltage |
| 3 | 0 | GND | Ground pin |

IC114 TC7S04F (Gate)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|------------------|
| 1 | | NC | |
| 2 | 0.9 | IN | Input |
| 3 | 0 | VSS | Ground pin |
| 4 | 3.99 | OUT | Inverted output |
| 5 | 4.68 | VDD | Power supply pin |

IC115 TC4S66F (Bilateral Switch)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|---|
| 1 | 3.31 | OUT | Output |
| 2 | 3.3 | IN | Input |
| 3 | 0 | VSS | Ground pin |
| 4 | 0 | CONT | Low impedance between in and out at "H", and high impedance between in and out at "L" |
| 5 | 4.63 | VDD | Power supply pin |

IC116 TC4S81F (2 Input and Gate)

| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|------------------|
| 1 | 4.46 | IN B | Input B |
| 2 | 0 | IN A | Input A |
| 3 | 0 | VSS | Ground pin |
| 4 | 0 | OUT | Output |
| 5 | 4.63 | VDD | Power supply pin |

IC117 TC4S30F (Exclusive OR Gate)

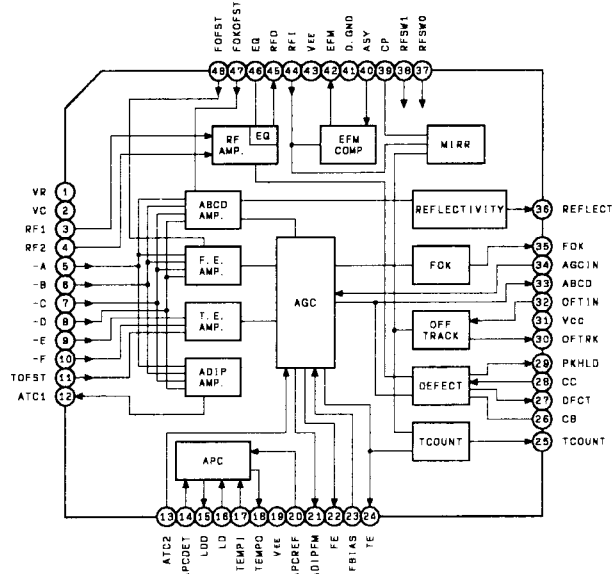
| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|------------------|
| 1 | 2.25 | IN B | Input B |
| 2 | 2.28 | IN A | Input A |
| 3 | 0 | VSS | Ground pin |
| 4 | 0.6 | OUT | Output |
| 5 | 4.62 | VDD | Power supply pin |

IC119 S-81330 (Voltage Regulator)

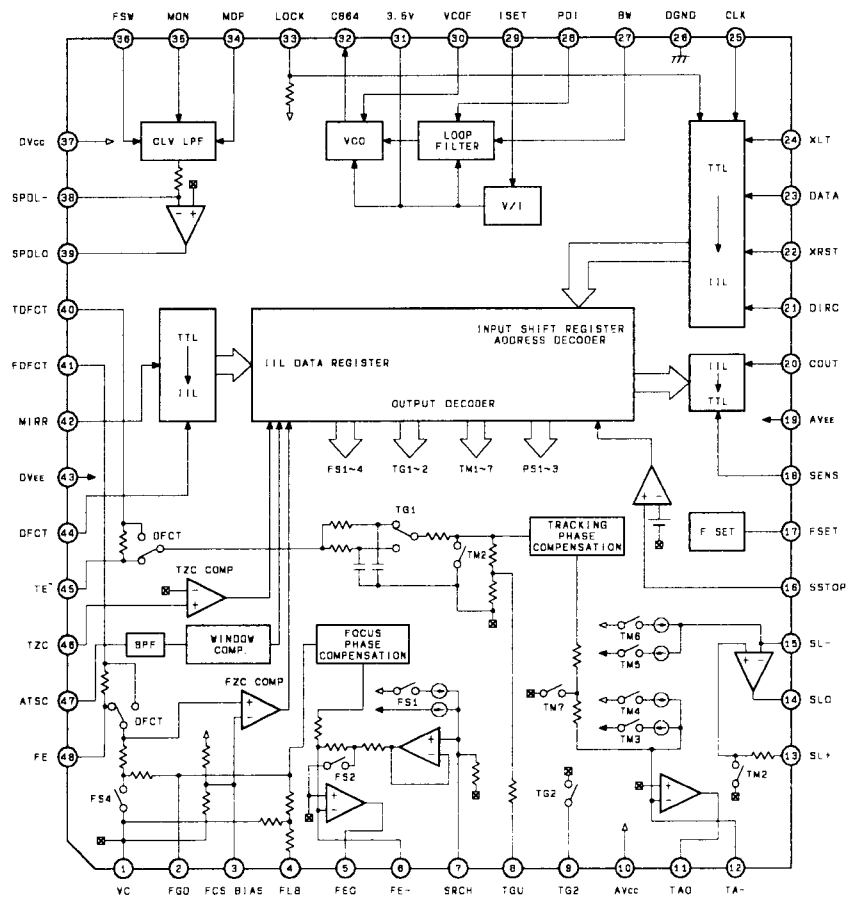
| PIN No. | PIN VOLTAGE (V) | SYMBOL | PIN DESCRIPTION |
|---------|-----------------|--------|-----------------|
| 1 | 3.05 | Vout | Output voltage |
| 2 | 0 | GND | Ground pin |
| 3 | 4.43 | Vin | Input voltage |

IC BLOCK DIAGRAM

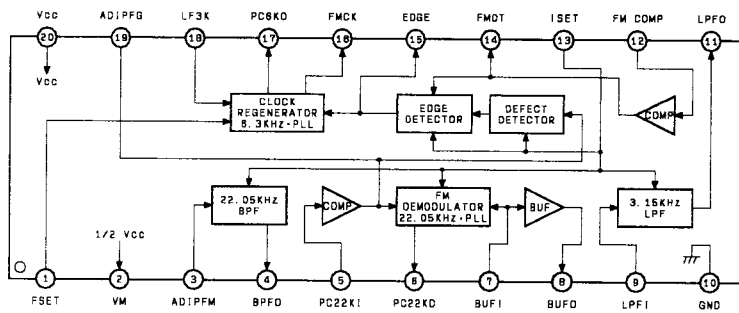
IC101 CXA1381Q BLOCK DIAGRAM (RF Matrix Amplifier)



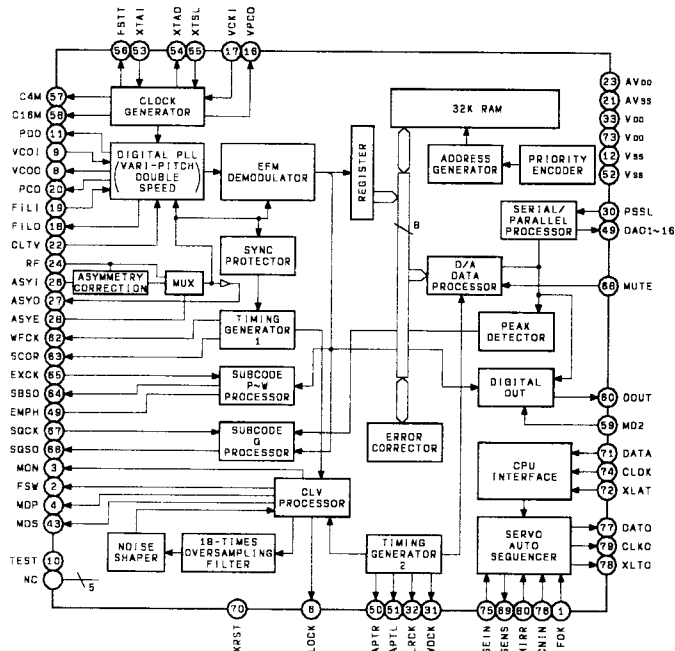
IC103 CXA1602Q BLOCK DIAGRAM (Focus/Tracking Coil & Motor Servo Control)



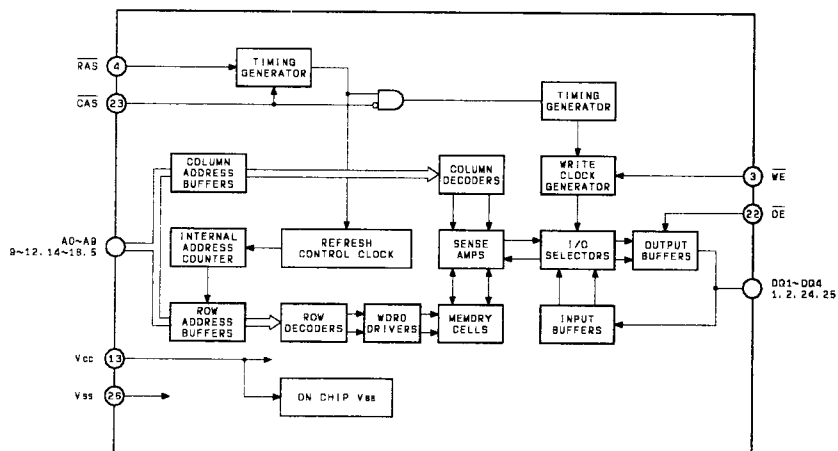
IC102 CXA1380M BLOCK DIAGRAM
(Address In Pre-groove)



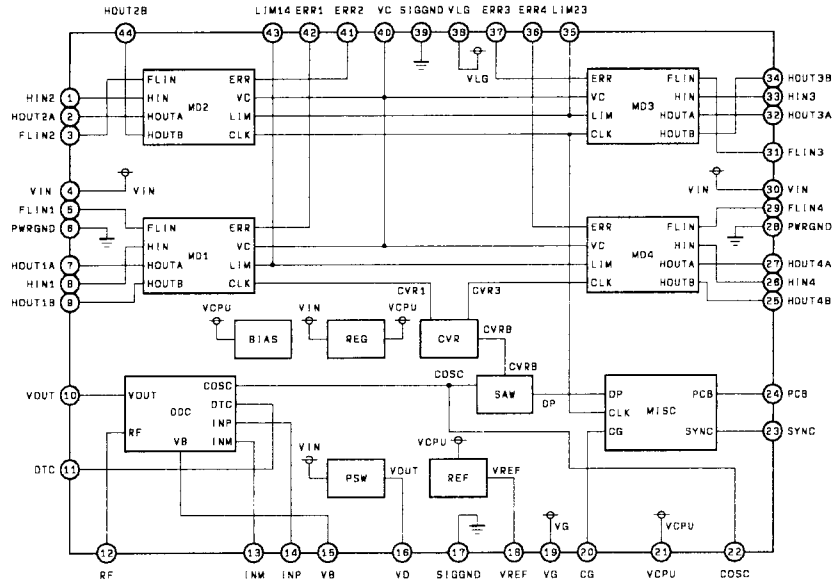
IC104 CXD2500BQ BLOCK DIAGRAM
(Digital Signal Processor)



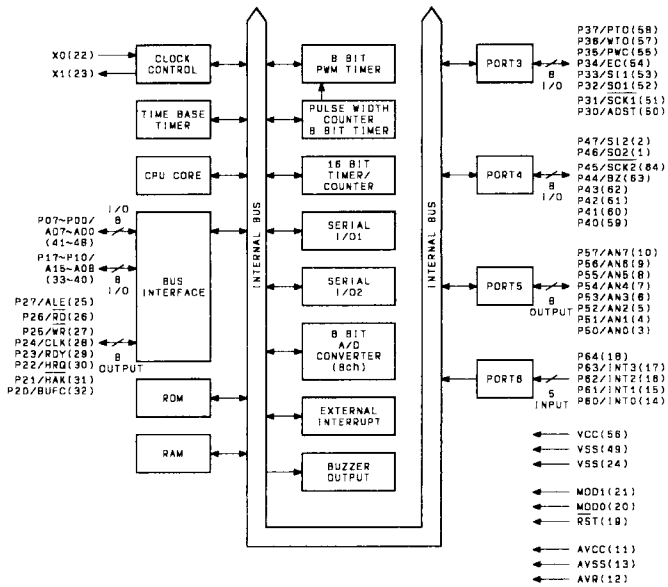
IC109 MSM514400AL-70-TS-KDR2*BLOCK DIAGRAM
(4M DRAM)



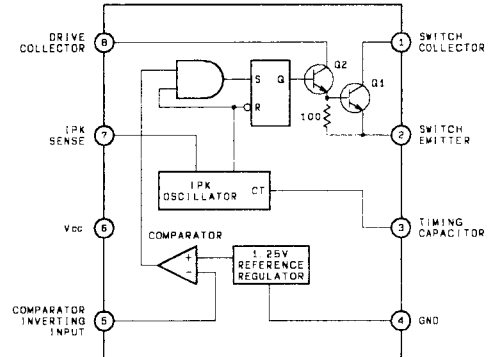
IC105 MPC1716AFU BLOCK DIAGRAM (4CH. H Bridge Multi Function Controller)



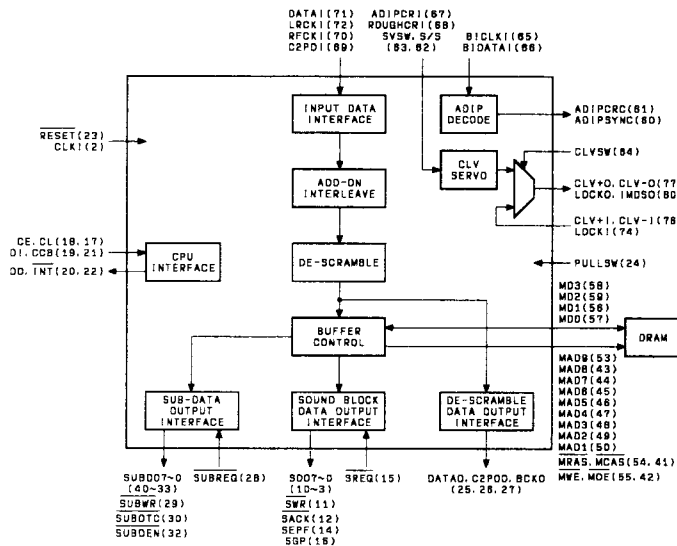
IC106 MB89P625PFM BLOCK DIAGRAM (System Control Micom)



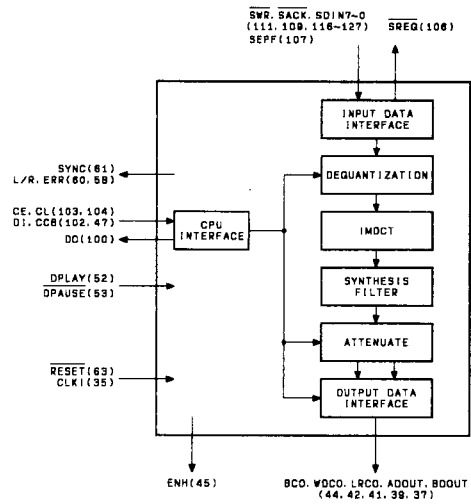
IC112 MC34063A BLOCK DIAGRAM (DC-DC Converter)



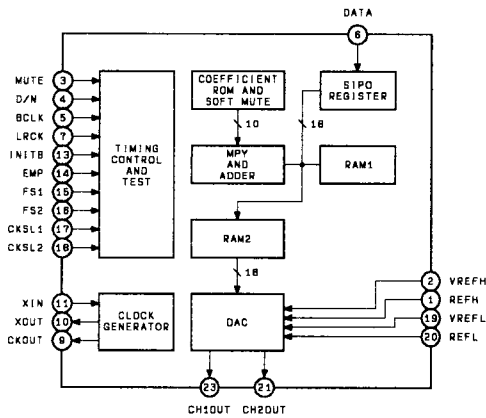
IC107 LC89601 BLOCK DIAGRAM
(Anti-Shock Control)



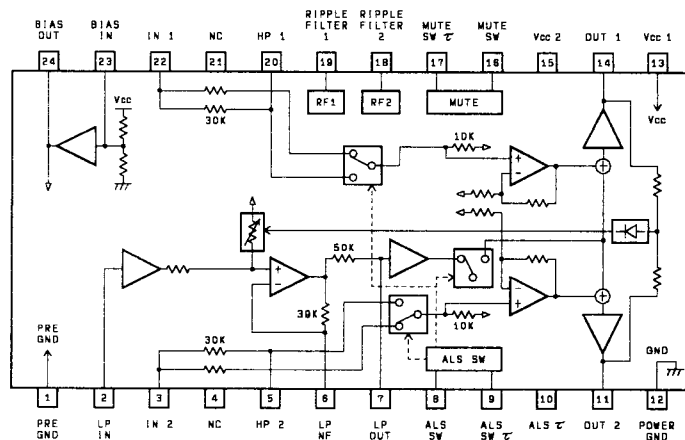
IC108 LC89600 BLOCK DIAGRAM
(Adaptive Transform Acoustic Coding)



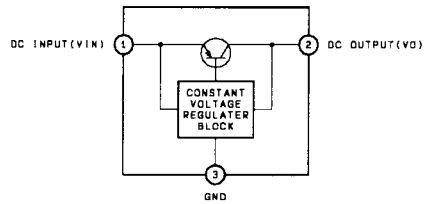
IC110 LC78835MF-TRM BLOCK DIAGRAM
(18 Bit Digital Filter & 18 Bit D/A Converter)



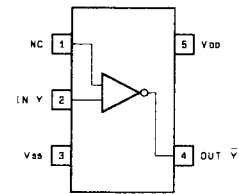
IC111 BA3570FS BLOCK DIAGRAM
(Headphone Driver)



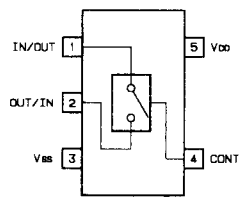
**IC113 PQ05SZ11 BLOCK DIAGRAM
(Regulator)**



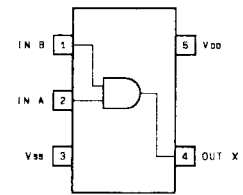
**IC114 TC7S04F-TE85R BLOCK DIAGRAM
(Gate)**



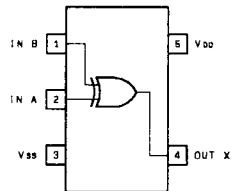
**IC115 TC4S66F-TE85R BLOCK DIAGRAM
(Bilateral Switch)**



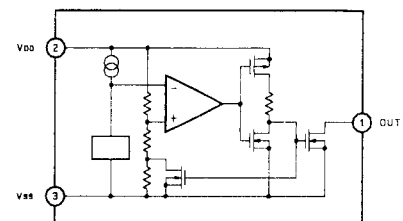
**IC116 TC4S81F-TE85R BLOCK DIAGRAM
(2 Input and Gate)**



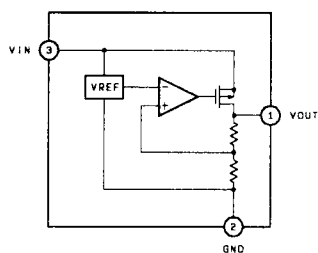
**IC117 TC4S30F-TE85R BLOCK DIAGRAM
(Exclusive OR Gate)**



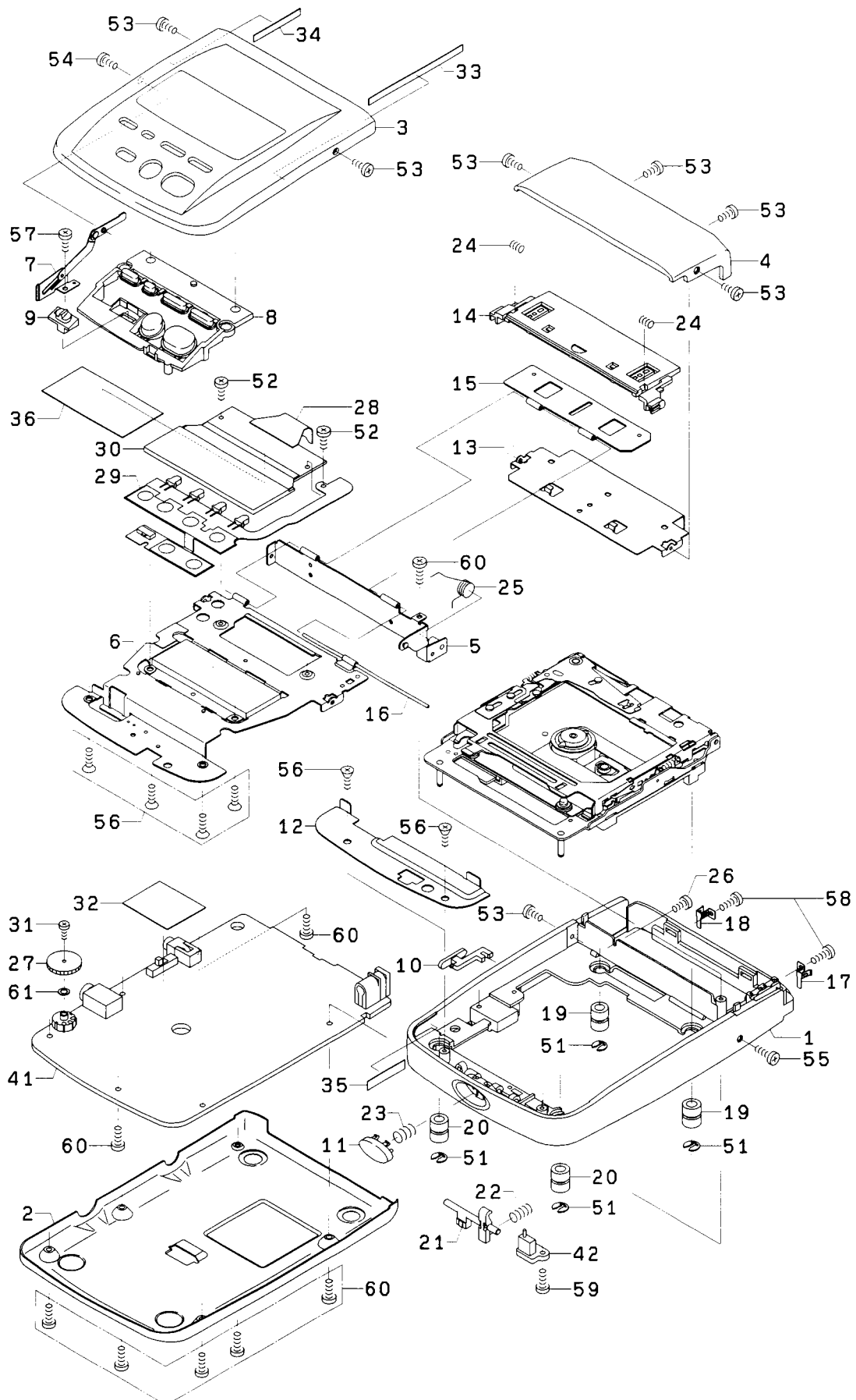
**IC119 S-80715AN-DC-T1 BLOCK DIAGRAM
(Voltage Detector)**



**IC120 S-81330HG-KB-T1 BLOCK DIAGRAM
(Regulator)**



CABINET EXPLODED VIEW



CABINET PARTS LIST

| Ref. No. | Part No. | Description | Q'ty |
|----------------|--------------|---------------------|------|
| PACKAGE | | | |
| | 620 220 0552 | Inner Carton | 1 |
| | 620 198 2466 | Poly Cover 80X150 | 1 |
| | 620 198 2725 | Poly Cover 100X150 | 1 |
| | 620 219 5841 | Poly Cover 160X160 | 2 |
| | 620 219 8941 | Sheet | 1 |
| | 620 219 5636 | Pad,Styrofoam | 1 |
| | 620 219 5643 | Pad,Plain | 1 |
| | 620 219 7524 | Spacer | 1 |
| | 620 219 7531 | Spacer | 1 |
| | 620 220 0682 | Label,Barcode | 1 |
| | 620 219 2543 | Label,Sanyo Premier | 1 |

ACCESSORIES

| | | | |
|---|--------------|---------------------------|---|
| | 620 219 5674 | Assy,Battery,Recharge CPL | 1 |
| | 620 218 1486 | Assy,Remocon,MDX-P1 | 1 |
| | 620 219 5698 | Assy,Case,Battery | 1 |
| | 620 219 5711 | Carrying Case | 1 |
| | 620 218 3466 | Headphone,16 MDX-P1 | 1 |
| △ | 620 220 0620 | Adaptor,AC-DC,6CV-230ES | 1 |
| | 620 216 3307 | Cord,Y,RCA,2P | 1 |
| | 620 217 1203 | Cord,Y,RCA,2P | 1 |
| | 620 220 0675 | Instruction Manual | 1 |

CABINET

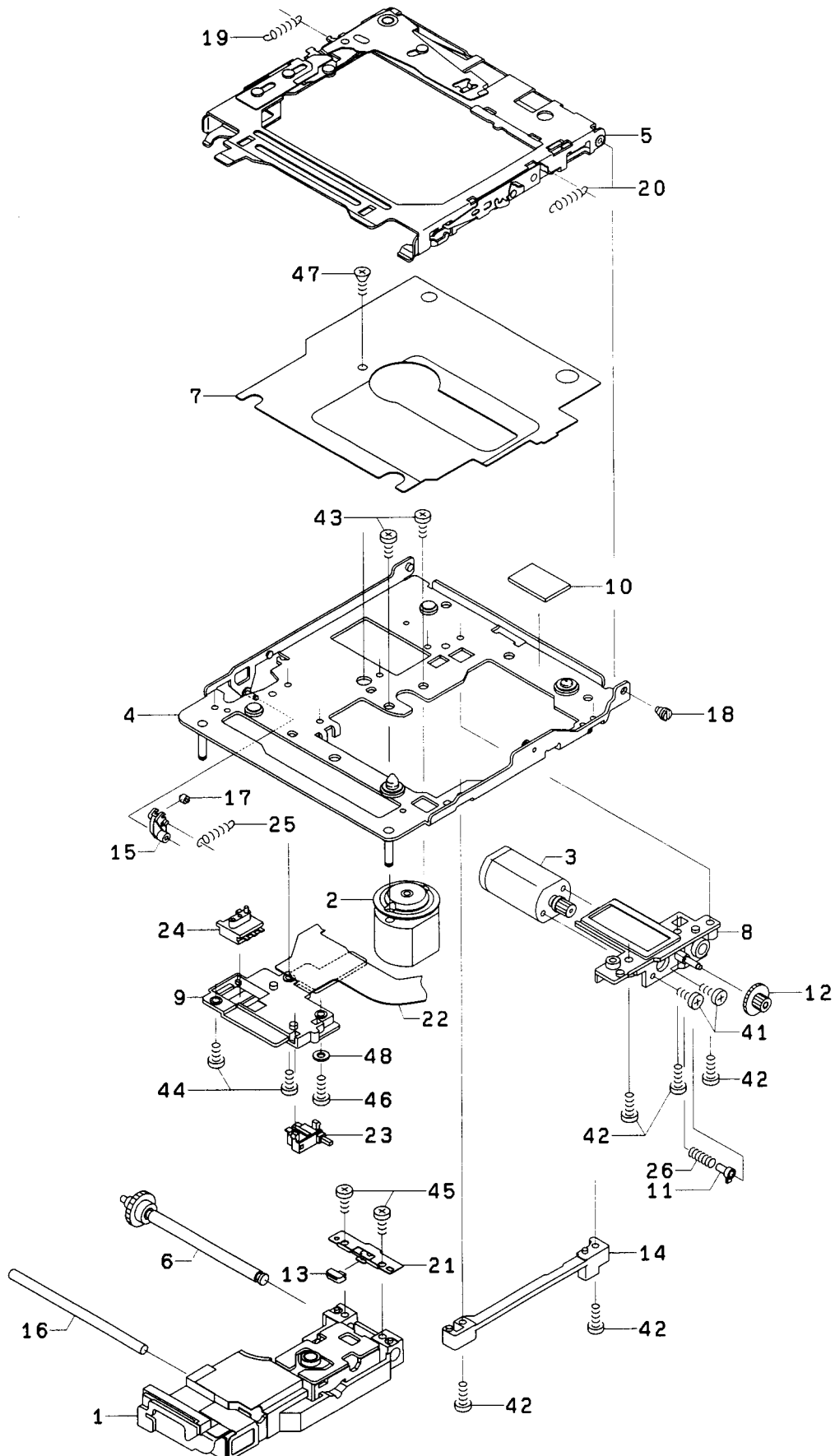
| | | | |
|----|--------------|---------------------------|---|
| | 620 219 6794 | Label,Ni-Cd,Caution | 1 |
| 1 | 620 218 2308 | Assy,Cabinet,Frame | 1 |
| 2 | 620 219 9993 | Assy,Cabinet,Bottom | 1 |
| 3 | 620 219 7487 | Assy,Lid,MD | 1 |
| 4 | 620 219 3984 | Assy,Lid,Battery,Ni-Cd | 1 |
| 5 | 620 218 2322 | Assy,Bracket-M,Cabinet | 1 |
| 6 | 620 218 7839 | Assy,Bracket-M,Lid | 1 |
| 7 | 620 219 2918 | Assy,Bracket-M,Lever,Lid | 1 |
| 8 | 620 218 2339 | Assy,Mount-M,Button | 1 |
| 9 | 620 217 8172 | Knob,Slide,Hold | 1 |
| 10 | 620 217 8226 | Knob,Slide,Bass | 1 |
| 11 | 620 217 8233 | Knob,Open | 1 |
| 12 | 620 217 8257 | Veil,Mechanism | 1 |
| 13 | 620 217 8189 | Bracket-M,Battery | 1 |
| 14 | 620 217 8097 | Mount-M,Battery | 1 |
| 15 | 620 217 8196 | Hinge,Battery | 1 |
| 16 | 620 218 0397 | Shaft,Hinge | 1 |
| 17 | 620 217 8271 | Terminal,Joint,Left | 1 |
| 18 | 620 217 8288 | Terminal,Joint,Right | 1 |
| 19 | 620 217 7625 | Cushion,Rubber | 2 |
| 20 | 620 217 7632 | Cushion,Rubber | 2 |
| 21 | 620 217 8240 | Lever,Lock | 1 |
| 22 | 620 218 2346 | Spring,Comp | 1 |
| 23 | 620 218 2353 | Spring,Comp | 1 |
| 24 | 620 218 2360 | Spring,Comp | 2 |
| 25 | 620 218 0403 | Spring,Torsion | 1 |
| 26 | 620 122 7536 | Screw + M1.7X2.0 | 1 |
| 27 | 620 217 8219 | Knob,Rotary,Volume | 1 |
| 28 | 620 218 3039 | FPC,LCD | 1 |
| 29 | 620 218 3022 | Switch,Tact,Pekomen NOK | 1 |
| 30 | 620 218 3213 | Display Module,LCD | 1 |
| 31 | 620 123 0765 | Screw | 1 |
| 32 | 620 219 4974 | Sheet | 1 |
| 33 | 620 219 7067 | Sheet | 1 |
| 34 | 620 219 7074 | Sheet | 1 |
| 35 | 620 219 7081 | Sheet | 1 |
| 36 | 620 219 8927 | Sheet | 1 |
| 41 | 620 218 3060 | Assy,PCB-ML,Main | 1 |
| 42 | 620 218 3077 | Assy,PCB-ML,Lid Switch | 1 |
| 51 | 412 047 7209 | SPECIAL WASHER | 4 |
| 52 | 411 018 0805 | SCR PAN PCS 1.7X2 | 2 |
| 53 | 411 018 1208 | SCR PAN PCS 1.7X2 | 7 |
| 54 | 411 018 1901 | SCR PAN PCS 1.7X2.5 | 1 |
| 55 | 411 018 3806 | SCR PAN PCS 1.7X4 | 1 |
| 56 | 411 156 8008 | SCR S-TPG FLT PCS 2X4 | 6 |
| 57 | 411 132 1306 | SCR S-TPG PAN PCS 1.7X3.5 | 1 |
| 58 | 411 160 5901 | SCR S-TPG PAN PCS 1.7X4 | 2 |
| 59 | 411 159 7305 | SCR S-TPG PAN PCS 2X4 | 1 |
| 60 | 411 156 8206 | SCR S-TPG PAN PCS 2X6 | 8 |
| 61 | 412 048 4702 | SPECIAL WASHER | 1 |

| Ref. No. | Part No. | Description | Q'ty |
|---------------|---|-------------|------|
| NOTES: | | | |
| 1. | Parts order must contain Model Number, Part Number and Description. | | |
| 2. | Ordering quantity of screws and resistors must be multiple of 10 pcs. | | |

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol \triangle in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with \triangle , use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

MECHANISM EXPLODED VIEW



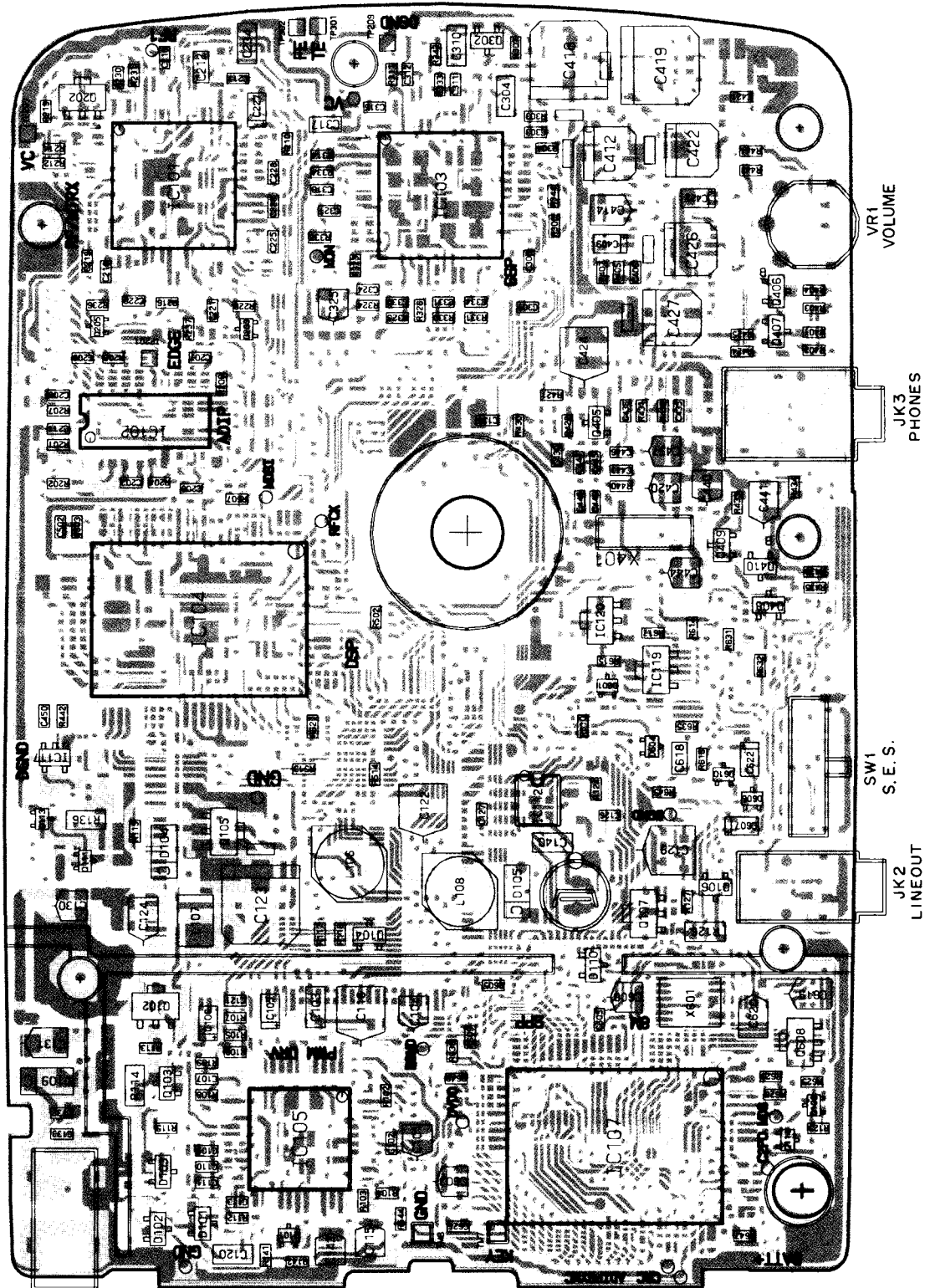
MECHANISM PARTS LIST

| Ref. No. | Part No. | Description | Q'ty |
|------------------|--------------|--------------------------------|------|
| MECHANISM | | | |
| | 620 214 0063 | Label, Serial No. | 1 |
| 1 | 620 218 3503 | Pickup, Laser, SF-R1 | 1 |
| 2 | 620 218 2926 | Assy, Motor, 3V, 0.5W, Spindle | 1 |
| 3 | 620 218 2933 | Assy, Motor, 3V, Sled | 1 |
| 4 | 620 217 7120 | Assy, Chassis | 1 |
| 5 | 620 217 7335 | Assy, Holder, Cartridge | 1 |
| 6 | 620 217 7298 | Assy, Spindle, Screw | 1 |
| 7 | 620 217 7618 | Cover, Chassis | 1 |
| 8 | 620 217 7526 | Bracket-E, Motor | 1 |
| 9 | 620 217 7588 | Spacer, Switch | 1 |
| 10 | 620 218 5484 | Cushion | 1 |
| 11 | 620 217 7540 | Pad, Spindle | 1 |
| 12 | 620 217 7557 | Gear, Middle | 1 |
| 13 | 620 217 7595 | Gear, Rack | 1 |
| 14 | 620 217 7502 | Holder, Spindle | 1 |
| 15 | 620 217 7489 | Lever, Lock, Holder | 1 |
| 16 | 620 217 7571 | Shaft, Slide | 1 |
| 17 | 620 217 7496 | Pin, Roller | 1 |
| 18 | 620 218 2919 | Pin, Holder, Cartridge | 1 |
| 19 | 620 217 7656 | Spring, Tens, Lever, Lock | 1 |
| 20 | 620 217 7663 | Spring, Tens, Lever, Stop | 1 |
| 21 | 620 217 7601 | Spring, Plate, Rack | 1 |
| 22 | 620 218 2940 | FPC, Switch | 1 |
| 23 | 620 218 2957 | Switch, Push, 1P-1T | 1 |
| 24 | 620 218 2964 | Switch, Push, 2P-1T | 1 |
| 25 | 620 138 9913 | Spring Lever Hold Record | 1 |
| 26 | 620 139 2234 | Spring Supply | 1 |
| 41 | 412 046 9808 | SPECIAL SCREW | 2 |
| 42 | 412 046 9907 | SPECIAL SCREW | 5 |
| 43 | 412 047 0002 | SPECIAL SCREW | 2 |
| 44 | 412 047 0101 | SPECIAL SCREW | 2 |
| 45 | 412 047 0200 | SPECIAL SCREW | 2 |
| 46 | 411 020 1203 | SCR PAN PCS 1.7X5 | 1 |
| 47 | 412 047 1702 | SPECIAL SCREW | 1 |
| 48 | 411 086 1407 | WASHER SPR 1.7 | 1 |

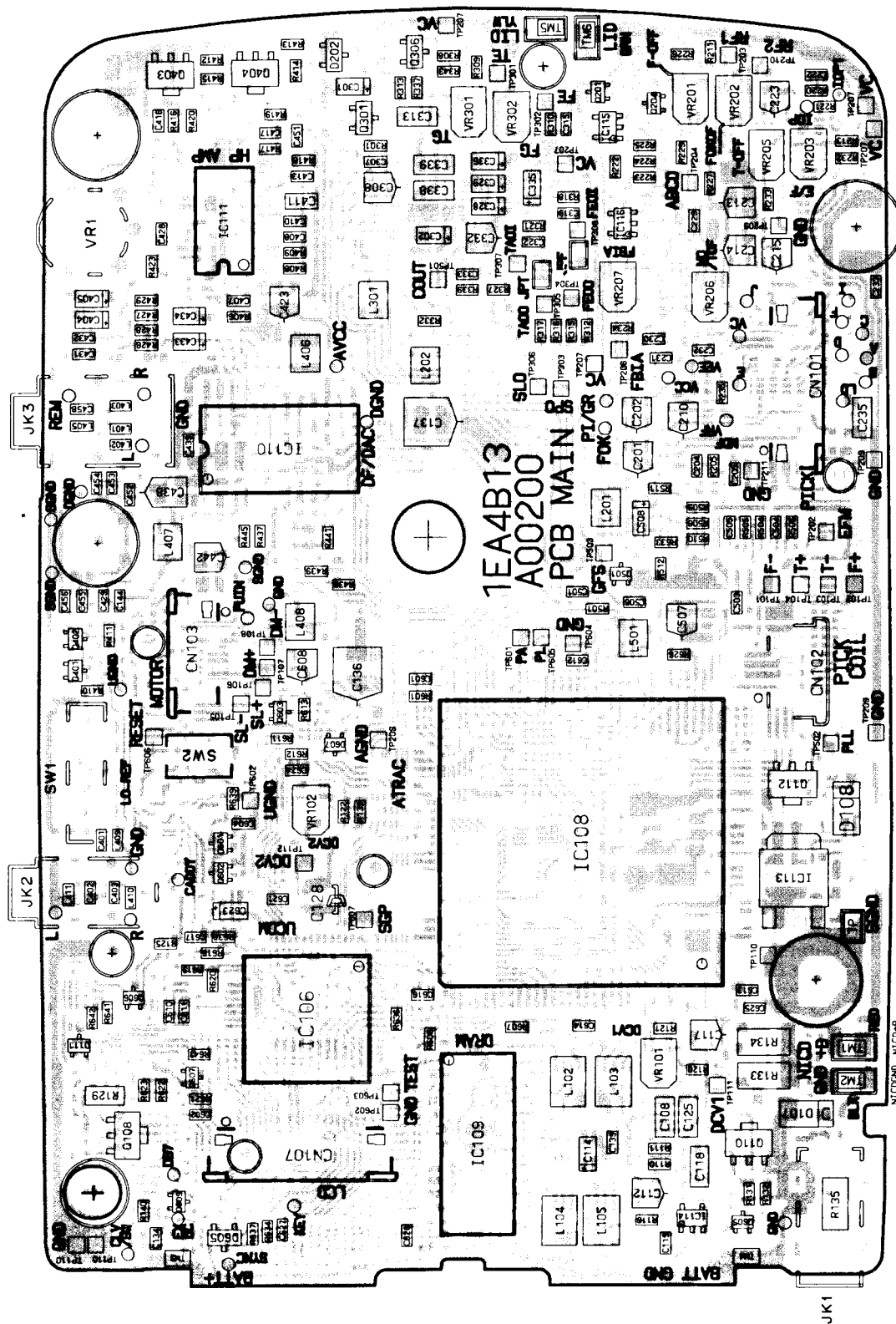
NOTES:

- Parts order must contain Model Number, Part Number and Description.
- Ordering quantity of screws and resistors must be multiple of 10 pcs.

MAIN PRINTED CIRCUIT BOARD (TOP VIEW)



MAIN PRINTED CIRCUIT BOARD (BOTTOM VIEW)



P.C.BOARD PARTS LIST

| Ref. No. | Part No. | Description | Q'ty | Ref. No. | Part No. | Description | Q'ty |
|-------------------------|--------------|----------------------------|------|----------|--------------|------------------------|------|
| ASSY,PCB-ML,MAIN | | | | Q109 | 405 096 3308 | TR DTC143ZU-T106 | 1 |
| 41 | 620 218 3060 | Assy,PCB-ML,Main | 1 | Q110 | 405 084 2405 | TR 2SC4390-TC | 1 |
| | 620 203 6403 | Shield,Plate | 1 | Q111 | 405 096 3308 | TR DTC143ZU-T106 | 1 |
| | 620 124 6926 | Cushion | 1 | Q112 | 405 061 6709 | TR 2SB1302-T-TC | 1 |
| CN101 | 620 218 3114 | Connector-S,18P | 1 | or | 405 061 6600 | TR 2SB1302-S-TC | 1 |
| CN102 | 620 215 3391 | Connector-S,4P | 1 | Q113 | 405 096 3308 | TR DTC143ZU-T106 | 1 |
| CN103 | 620 218 3121 | Connector-S,10P | 1 | Q114 | 405 096 3308 | TR DTC143ZU-T106 | 1 |
| CN107 | 620 218 3107 | Connector-S,20P | 1 | Q201 | 405 096 1106 | TR DTA144EU---G | 1 |
| JK1 | 620 218 2728 | Jack,DC,5.15D | 1 | Q202 | 405 061 6709 | TR 2SB1302-T-TC | 1 |
| JK2 | 620 187 1333 | Jack 3P | 1 | or | 405 061 6600 | TR 2SB1302-S-TC | 1 |
| JK3 | 620 207 7949 | Jack,H/P,5P | 1 | Q203 | 405 096 2400 | TR DTC144EU T107 | 1 |
| L102 | 620 218 9147 | Inductor 100UH K | 1 | Q204 | 405 096 2400 | TR DTC144EU T107 | 1 |
| L103 | 620 218 9147 | Inductor 100UH K | 1 | Q205 | 405 096 1106 | TR DTA144EU---G | 1 |
| L104 | 620 218 9147 | Inductor 100UH K | 1 | Q301 | 405 021 2307 | TR 2SD1048-X6-TA | 1 |
| L105 | 620 218 9147 | Inductor 100UH K | 1 | or | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L106 | 620 218 9154 | Inductor 39UH M | 1 | Q302 | 405 064 6300 | TR 2SB1295-6-TA | 1 |
| L107 | 620 218 8089 | Inductor 15UH K | 1 | Q306 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L108 | 620 218 9154 | Inductor 39UH M | 1 | or | 405 021 2307 | TR 2SD1048-X6-TA | 1 |
| L201 | 620 218 9123 | Inductor 10UH K | 1 | Q401 | 405 096 1106 | TR DTA144EU---G | 1 |
| L202 | 620 218 9123 | Inductor 10UH K | 1 | Q402 | 405 096 1106 | TR DTA144EU---G | 1 |
| L301 | 620 218 9123 | Inductor 10UH K | 1 | Q403 | 405 084 2405 | TR 2SC4390-TC | 1 |
| L401 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q404 | 405 084 2405 | TR 2SC4390-TC | 1 |
| L402 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q405 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L403 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q406 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L405 | 620 219 7098 | Inductor 220UH K | 1 | Q407 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| or | 620 218 7242 | Inductor 220UH K | 1 | Q408 | 405 064 6300 | TR 2SB1295-6-TA | 1 |
| L406 | 620 218 9123 | Inductor 10UH K | 1 | Q409 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L407 | 620 218 9123 | Inductor 10UH K | 1 | Q410 | 405 021 2406 | TR 2SD1048-X7-TA | 1 |
| L408 | 620 218 9123 | Inductor 10UH K | 1 | Q501 | 405 096 2400 | TR DTC144EU T107 | 1 |
| L409 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q601 | 405 096 1106 | TR DTA144EU---G | 1 |
| L410 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q602 | 405 096 2400 | TR DTC144EU T107 | 1 |
| L411 | 620 218 2544 | Inductor,Ferrite,Chip | 1 | Q603 | 405 096 2400 | TR DTC144EU T107 | 1 |
| L501 | 620 218 9123 | Inductor 10UH K | 1 | Q605 | 405 096 1106 | TR DTA144EU---G | 1 |
| SW1 | 620 218 2698 | Switch,Slide,2-2-3 (S.E.S) | 1 | Q606 | 405 096 1106 | TR DTA144EU---G | 1 |
| SW2 | 620 218 8072 | Switch,Tact,L = 2.5,160G | 1 | Q607 | 405 096 1106 | TR DTA144EU---G | 1 |
| VR1 | 620 006 0790 | Rotary VR 2X10KA | 1 | Q608 | 405 123 7408 | TR 2SD2153V | 1 |
| VR101 | 620 218 5149 | VR,Semi 22K S | 1 | Q609 | 405 096 1106 | TR DTA144EU---G | 1 |
| VR102 | 620 218 5088 | VR,Semi 1K S | 1 | Q610 | 405 096 2400 | TR DTC144EU T107 | 1 |
| VR201 | 620 218 5149 | VR,Semi 22K S | 1 | D101 | 407 112 4207 | DIODE RB400D-T147 | 1 |
| VR202 | 620 218 5149 | VR,Semi 22K S | 1 | D102 | 407 112 4207 | DIODE RB400D-T147 | 1 |
| VR203 | 620 218 9161 | VR,Semi 4.7K S | 1 | D103 | 407 112 4207 | DIODE RB400D-T147 | 1 |
| VR205 | 620 218 5149 | VR,Semi 22K S | 1 | D104 | 407 159 8800 | DIODE EC10QS02L | 1 |
| VR206 | 620 218 5149 | VR,Semi 22K S | 1 | D105 | 407 159 8800 | DIODE EC10QS02L | 1 |
| VR207 | 620 218 5149 | VR,Semi 22K S | 1 | D107 | 407 159 8800 | DIODE EC10QS02L | 1 |
| VR301 | 620 218 5156 | VR,Semi 47K S | 1 | D108 | 407 160 4204 | DIODE 1SR154-1 | 1 |
| VR302 | 620 218 5149 | VR,Semi 22K S | 1 | or | 407 108 4006 | DIODE DSM10C-TR | 1 |
| X401 | 620 007 3288 | Crystal 16.9344MHz | 1 | or | 407 108 4105 | DIODE DSM10E-TR | 1 |
| X601 | 620 218 2988 | Resonator,8MHz | 1 | D109 | 407 159 8800 | DIODE EC10QS02L | 1 |
| IC101 | 409 309 1808 | IC CXA1381Q | 1 | D110 | 407 160 4105 | DIODE DDRB425D | 1 |
| IC102 | 409 309 1709 | IC CXA1380M | 1 | D111 | 407 159 8909 | DIODE RB451F | 1 |
| IC103 | 409 309 1907 | IC CXA1602Q | 1 | D202 | 407 071 6007 | ZENER DIODE DZD4.7X-TA | 1 |
| IC104 | 409 307 3804 | IC CXD2500BQ | 1 | D601 | 407 159 8909 | DIODE RB451F | 1 |
| IC105 | 409 317 7908 | IC MPC1716AFU | 1 | D604 | 407 159 8909 | DIODE RB451F | 1 |
| IC106 | 409 312 5701 | IC MB89P625PFM | 1 | D605 | 407 160 4105 | DIODE DDRB425D | 1 |
| or | 409 309 2003 | IC MB89625 | 1 | D606 | 407 159 8909 | DIODE RB451F | 1 |
| IC107 | 409 304 0202 | IC LC89601 | 1 | D607 | 407 159 8909 | DIODE RB451F | 1 |
| IC108 | 409 304 0103 | IC LC89600 | 1 | C101 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| IC109 | 410 170 2702 | IC MSM514400AL-70-TS-KDR2 | 1 | C102 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| or | 410 154 3909 | IC MT4C4001JTG-8L | 1 | C103 | 403 134 7400 | CERAMIC 1U Z 16V | 1 |
| or | 410 146 9605 | IC MB814400-80LPFTN-G | 1 | C104 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| IC110 | 409 294 4709 | IC LC78835M-M-TLM | 1 | C105 | 403 241 0103 | TA-SOLID 1U M 25V | 1 |
| IC111 | 409 311 0400 | IC BA3570FS | 1 | C106 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| IC112 | 409 257 7709 | IC MC34063A | 1 | C107 | 403 157 7104 | CERAMIC 2700P K 50V | 1 |
| IC113 | 409 309 2201 | IC PQ05SZ11 | 1 | C108 | 403 134 7400 | CERAMIC 1U Z 16V | 1 |
| IC114 | 409 155 8006 | IC TC7S04F-TE85R | 1 | C109 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| IC115 | 409 155 7702 | IC TC4S66F-TE85R | 1 | C110 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| IC116 | 409 137 9007 | IC TC4S81F-TE85R | 1 | C111 | 403 157 6800 | CERAMIC 680P K 50V | 1 |
| IC117 | 409 155 7603 | IC TC4S30F-TE85R | 1 | C112 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| IC119 | 409 312 2502 | IC S-80715AN-DC-T1 | 1 | C113 | 403 157 6602 | CERAMIC 470P K 50V | 1 |
| IC120 | 409 312 2601 | IC S-81330HG-KB-T1 | 1 | C114 | 403 241 0103 | TA-SOLID 1U M 25V | 1 |
| Q101 | 405 096 2400 | TR DTC144EU T107 | 1 | C115 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| Q102 | 405 117 5700 | TR 2SJ316-TD | 1 | C116 | 403 266 0508 | TA-SOLID 47U M 10V | 1 |
| Q103 | 405 021 2406 | TR 2SD1048-X7-TA | 1 | C117 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| Q104 | 405 064 6300 | TR 2SB1295-6-TA | 1 | C118 | 403 134 7400 | CERAMIC 1U Z 16V | 1 |
| Q105 | 405 084 2405 | TR 2SC4390-TC | 1 | C119 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| Q106 | 405 021 2406 | TR 2SD1048-X7-TA | 1 | C120 | 403 134 7400 | CERAMIC 1U Z 16V | 1 |
| Q107 | 405 117 5700 | TR 2SJ316-TD | 1 | C121 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| Q108 | 405 061 6709 | TR 2SB1302-T-TC | 1 | C122 | 403 266 0508 | TA-SOLID 47U M 10V | 1 |
| or | 405 061 6600 | TR 2SB1302-S-TC | 1 | C123 | 403 264 7905 | ELECT 100U M 16V | 1 |

P.C.BOARD PARTS LIST (Continued)

| Ref. No. | Part No. | Description | Q'ty | Ref. No. | Part No. | Description | Q'ty |
|----------|--------------|----------------------|------|----------|--------------|----------------------|------|
| C124 | 403 266 0300 | TA-SOLID 15U M 10V | 1 | C334 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C125 | 403 134 7400 | CERAMIC 1U Z 16V | 1 | C335 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C126 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C336 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C127 | 403 155 1500 | CERAMIC 180P J 50V | 1 | C338 | 403 149 7303 | CERAMIC 0.47U Z 16V | 1 |
| C128 | 403 154 3109 | OS-SOLID 33U M 10V | 1 | C339 | 403 149 7303 | CERAMIC 0.47U Z 16V | 1 |
| C129 | 403 266 0508 | TA-SOLID 47U M 10V | 1 | C401 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C130 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C402 | 403 157 3601 | CERAMIC 100P J 50V | 1 |
| C131 | 403 266 0300 | TA-SOLID 15U M 10V | 1 | C403 | 403 157 3601 | CERAMIC 100P J 50V | 1 |
| C132 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C404 | 403 241 0103 | TA-SOLID 1U M 25V | 1 |
| C133 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C405 | 403 241 0103 | TA-SOLID 1U M 25V | 1 |
| C134 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C406 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C135 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C407 | 403 070 2606 | CERAMIC 0.1U Z 50V | 1 |
| C136 | 403 266 0508 | TA-SOLID 47U M 10V | 1 | C408 | 403 113 4109 | CERAMIC 2200P K 50V | 1 |
| C137 | 403 266 0508 | TA-SOLID 47U M 10V | 1 | C409 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C139 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C410 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C140 | 403 134 7400 | CERAMIC 1U Z 16V | 1 | C411 | 403 256 2406 | CERAMIC 0.22U Z 50V | 1 |
| C143 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C412 | 403 162 3900 | ELECT 47U M 4V | 1 |
| C144 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C413 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C201 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C414 | 403 233 8407 | TA-SOLID 22U M 6.3V | 1 |
| C202 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C416 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C203 | 403 155 2309 | CERAMIC 4700P K 50V | 1 | C417 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C204 | 403 113 4109 | CERAMIC 2200P K 50V | 1 | C418 | 403 175 4604 | ELECT 220U M 4V | 1 |
| C205 | 403 157 2505 | CERAMIC 27P J 50V | 1 | C419 | 403 175 4604 | ELECT 220U M 4V | 1 |
| C206 | 403 157 7906 | CERAMIC 0.047U Z 16V | 1 | C420 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C207 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C421 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C208 | 403 169 2807 | CERAMIC 330P J 50V | 1 | C422 | 403 162 3900 | ELECT 47U M 4V | 1 |
| C209 | 403 157 8101 | CERAMIC 0.068U Z 16V | 1 | C423 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C210 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C424 | 403 266 0508 | TA-SOLID 47U M 10V | 1 |
| C211 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C425 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C212 | 403 256 2406 | CERAMIC 0.22U Z 50V | 1 | C426 | 403 162 3801 | ELECT 33U M 4V | 1 |
| C213 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C427 | 403 175 3102 | ELECT 100U M 4V | 1 |
| C214 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C428 | 403 113 4109 | CERAMIC 2200P K 50V | 1 |
| C215 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C430 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C216 | 403 157 7104 | CERAMIC 2700P K 50V | 1 | C431 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C217 | 403 262 0502 | CERAMIC 0.033U K 16V | 1 | C432 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C218 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C433 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C219 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C434 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C220 | 403 215 2904 | CERAMIC 0.022U K 25V | 1 | C435 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C221 | 403 157 3601 | CERAMIC 100P J 50V | 1 | C436 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C222 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C437 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C223 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C438 | 403 266 0300 | TA-SOLID 15U M 10V | 1 |
| C225 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C439 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C226 | 403 157 7302 | CERAMIC 6800P K 50V | 1 | C440 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C227 | 403 241 0103 | TA-SOLID 1U M 25V | 1 | C441 | 403 266 0300 | TA-SOLID 15U M 10V | 1 |
| C228 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C442 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C229 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C443 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C230 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C444 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C231 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C445 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C232 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C446 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C233 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C447 | 403 153 9102 | CERAMIC 5P C 50V | 1 |
| C234 | 403 134 7400 | CERAMIC 1U Z 16V | 1 | C448 | 403 139 7108 | CERAMIC 12P J 50V | 1 |
| C235 | 403 134 7400 | CERAMIC 1U Z 16V | 1 | C449 | 403 139 7108 | CERAMIC 12P J 50V | 1 |
| C301 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 | C450 | 403 157 3601 | CERAMIC 100P J 50V | 1 |
| C302 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 | C451 | 403 070 2606 | CERAMIC 0.1U Z 50V | 1 |
| C303 | 403 262 0502 | CERAMIC 0.033U K 16V | 1 | C452 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C304 | 403 149 7303 | CERAMIC 0.47U Z 16V | 1 | C453 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C305 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C454 | 403 113 3805 | CERAMIC 1000P K 50V | 1 |
| C306 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C455 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C307 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C456 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C308 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C458 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C310 | 403 134 7400 | CERAMIC 1U Z 16V | 1 | C501 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C311 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C502 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C312 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C503 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C313 | 403 149 7303 | CERAMIC 0.47U Z 16V | 1 | C504 | 403 155 2101 | CERAMIC 1500P K 50V | 1 |
| C315 | 403 157 7302 | CERAMIC 6800P K 50V | 1 | C505 | 403 157 7906 | CERAMIC 0.047U Z 16V | 1 |
| C316 | 403 157 4202 | CERAMIC 220P J 50V | 1 | C506 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C317 | 403 256 2406 | CERAMIC 0.22U Z 50V | 1 | C507 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C318 | 403 157 7906 | CERAMIC 0.047U Z 16V | 1 | C508 | 403 241 0103 | TA-SOLID 1U M 25V | 1 |
| C319 | 403 169 2807 | CERAMIC 330P J 50V | 1 | C601 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C321 | 403 157 7906 | CERAMIC 0.047U Z 16V | 1 | C602 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C322 | 403 169 2807 | CERAMIC 330P J 50V | 1 | C603 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C324 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | C604 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 |
| C325 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C605 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |
| C328 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 | C606 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C329 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 | C607 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 |
| C330 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | C608 | 403 266 0201 | TA-SOLID 10U M 10V | 1 |
| C331 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C610 | 403 145 9905 | CERAMIC 22P J 50V | 1 |
| C332 | 403 266 0201 | TA-SOLID 10U M 10V | 1 | C611 | 403 145 9905 | CERAMIC 22P J 50V | 1 |
| C333 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | C612 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 |

P.C.BOARD PARTS LIST (Continued)

| Ref. No. | Part No. | Description | Q'ty | Ref. No. | Part No. | Description | Q'ty |
|----------|--------------|------------------------|------|----------|--------------|------------------------|------|
| C613 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | R231 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| C614 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | R232 | 401 105 3307 | MT-GLAZE 2.7K JA1/16W | 1 |
| C616 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | R233 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| C617 | 403 215 2201 | CERAMIC 0.01U K 50V | 1 | R234 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| C618 | 403 256 2406 | CERAMIC 0.22U Z 50V | 1 | R235 | 401 105 6805 | MT-GLAZE 6.8K JA1/16W | 1 |
| C619 | 403 233 8407 | TA-SOLID 22U M 6.3V | 1 | R236 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| C620 | 403 233 8407 | TA-SOLID 22U M 6.3V | 1 | R237 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| C621 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | R301 | 401 105 4007 | MT-GLAZE 330 JA1/16W | 1 |
| C622 | 403 241 0103 | TA-SOLID 1U M 25V | 1 | R303 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| C623 | 403 266 0409 | TA-SOLID 4.7U M 10V | 1 | R304 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| C624 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | R306 | 401 105 2201 | MT-GLAZE 180K JA1/16W | 1 |
| C625 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | R307 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| C626 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | R308 | 401 113 8202 | MT-GLAZE 51K JA1/16W | 1 |
| C627 | 403 157 8309 | CERAMIC 0.1U Z 16V | 1 | R309 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| C628 | 403 113 3805 | CERAMIC 1000P K 50V | 1 | R310 | 401 105 6001 | MT-GLAZE 5.6K JA1/16W | 1 |
| C630 | 403 069 1207 | CERAMIC 1000P K 50V | 1 | R311 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| or | 403 069 1207 | CERAMIC 1000P K 50V | 1 | R312 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R102 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 | R313 | 401 105 6605 | MT-GLAZE 6.8K JA1/16W | 1 |
| R103 | 401 105 4502 | MT-GLAZE 390 JA1/16W | 1 | R314 | 401 105 2102 | MT-GLAZE 18K JA1/16W | 1 |
| R104 | 401 105 1501 | MT-GLAZE 1.5K JA1/16W | 1 | R315 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R105 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 | R316 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R106 | 401 105 8104 | MT-GLAZE 56K JA1/16W | 1 | R317 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R107 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 | R318 | 401 113 8509 | MT-GLAZE 91K JA1/16W | 1 |
| R108 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 | R321 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R109 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 | R323 | 401 105 3505 | MT-GLAZE 270K JA1/16W | 1 |
| R110 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 | R324 | 401 105 2904 | MT-GLAZE 22K JA1/16W | 1 |
| R111 | 401 105 8104 | MT-GLAZE 56K JA1/16W | 1 | R326 | 401 105 1501 | MT-GLAZE 1.5K JA1/16W | 1 |
| R112 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 | R327 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R113 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 | R329 | 401 105 2904 | MT-GLAZE 22K JA1/16W | 1 |
| R114 | 401 036 1403 | MT-GLAZE 220 JA 1/8W | 1 | R330 | 401 105 6100 | MT-GLAZE 560K JA1/16W | 1 |
| R115 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 | R331 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R116 | 401 105 7305 | MT-GLAZE 820 JA1/16W | 1 | R332 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R117 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 | R333 | 401 105 1709 | MT-GLAZE 150K JA1/16W | 1 |
| R118 | 401 105 4007 | MT-GLAZE 330 JA1/16W | 1 | R334 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 |
| R119 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 | R337 | 401 105 6001 | MT-GLAZE 5.6K JA1/16W | 1 |
| R120 | 401 113 9407 | MT-GLAZE 510K JA1/16W | 1 | R338 | 401 105 4205 | MT-GLAZE 33K JA1/16W | 1 |
| R121 | 401 105 7503 | MT-GLAZE 82K JA1/16W | 1 | R339 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R122 | 401 105 7404 | MT-GLAZE 8.2K JA1/16W | 1 | R342 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| R123 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 | R343 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R124 | 401 105 1907 | MT-GLAZE 180 JA1/16W | 1 | R344 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 |
| R125 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 | R401 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R126 | 401 036 1403 | MT-GLAZE 220 JA 1/8W | 1 | R402 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R127 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 | R403 | 401 105 2904 | MT-GLAZE 22K JA1/16W | 1 |
| R129 | 401 036 1403 | MT-GLAZE 220 JA 1/8W | 1 | R404 | 401 105 2904 | MT-GLAZE 22K JA1/16W | 1 |
| R131 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 | R405 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R132 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 | R406 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R133 | 401 217 4209 | MT-GLAZE 3.3 JA 1/2W | 1 | R407 | 401 105 1006 | MT-GLAZE 1.2K JA1/16W | 1 |
| R134 | 401 217 4209 | MT-GLAZE 3.3 JA 1/2W | 1 | R408 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R135 | 401 113 2002 | MT-GLAZE 18 JA 1/2W | 1 | R409 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R136 | 401 036 1403 | MT-GLAZE 220 JA 1/8W | 1 | R410 | 401 105 2805 | MT-GLAZE 2.2K JA1/16W | 1 |
| R139 | 401 113 6109 | MT-GLAZE 2.4K JA1/16W | 1 | R411 | 401 105 2805 | MT-GLAZE 2.2K JA1/16W | 1 |
| R140 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 | R412 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R141 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 | R413 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R142 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 | R414 | 401 148 6006 | MT-GLAZE 2.2 JA1/16W | 1 |
| R201 | 401 113 8905 | MT-GLAZE 200K JA1/16W | 1 | R415 | 401 148 6006 | MT-GLAZE 2.2 JA1/16W | 1 |
| R202 | 401 105 0405 | MT-GLAZE 100 JA1/16W | 1 | R416 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R204 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 | R417 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R205 | 401 113 9308 | MT-GLAZE 430K JA1/16W | 1 | R418 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| R206 | 401 113 8905 | MT-GLAZE 200K JA1/16W | 1 | R419 | 401 105 0306 | MT-GLAZE 10 JA1/16W | 1 |
| R207 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 | R420 | 401 105 0306 | MT-GLAZE 10 JA1/16W | 1 |
| R208 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 | R421 | 401 105 4601 | MT-GLAZE 3.9K JA1/16W | 1 |
| R210 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 | R422 | 401 105 7305 | MT-GLAZE 820 JA1/16W | 1 |
| R211 | 401 113 8509 | MT-GLAZE 91K JA1/16W | 1 | R423 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R212 | 401 113 6109 | MT-GLAZE 2.4K JA1/16W | 1 | R424 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R213 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 | R425 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R214 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 | R426 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R216 | 401 105 3000 | MT-GLAZE 220K JA1/16W | 1 | R427 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R219 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 | R428 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R220 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 | R429 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R221 | 401 105 0306 | MT-GLAZE 10 JA1/16W | 1 | R430 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R222 | 401 105 3000 | MT-GLAZE 220K JA1/16W | 1 | R431 | 401 105 7305 | MT-GLAZE 820 JA1/16W | 1 |
| R223 | 401 105 2201 | MT-GLAZE 180K JA1/16W | 1 | R432 | 401 105 7305 | MT-GLAZE 820 JA1/16W | 1 |
| R224 | 401 105 6506 | MT-GLAZE 680 JA1/16W | 1 | R433 | 401 105 2805 | MT-GLAZE 2.2K JA1/16W | 1 |
| R225 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 | R434 | 401 105 1709 | MT-GLAZE 150K JA1/16W | 1 |
| R226 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 | R435 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R227 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 | R436 | 401 105 6605 | MT-GLAZE 6.8K JA1/16W | 1 |
| R228 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 | R437 | 401 105 6506 | MT-GLAZE 680 JA1/16W | 1 |
| R229 | 401 105 6001 | MT-GLAZE 5.6K JA1/16W | 1 | R438 | 401 105 6506 | MT-GLAZE 680 JA1/16W | 1 |
| R230 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 | R439 | 401 105 6506 | MT-GLAZE 680 JA1/16W | 1 |

P.C.BOARD PARTS LIST (Continued)

| Ref. No. | Part No. | Description | Q'ty |
|-------------|--------------|------------------------|------|
| R440 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R441 | 401 105 8005 | MT-GLAZE 1M JA1/16W | 1 |
| R442 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R443 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R444 | 401 105 0504 | MT-GLAZE 1K JA1/16W | 1 |
| R445 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R501 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R502 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R503 | 401 113 6802 | MT-GLAZE 11K JA1/16W | 1 |
| R504 | 401 113 7106 | MT-GLAZE 24K JA1/16W | 1 |
| R505 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R506 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R507 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R508 | 401 105 4700 | MT-GLAZE 39K JA1/16W | 1 |
| R509 | 401 105 7404 | MT-GLAZE 8.2K JA1/16W | 1 |
| R510 | 401 105 4700 | MT-GLAZE 39K JA1/16W | 1 |
| R511 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R512 | 401 105 8203 | MT-GLAZE 68K JA1/16W | 1 |
| R513 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R514 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R601 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R605 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R606 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R607 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R609 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R610 | 401 105 2003 | MT-GLAZE 1.8K JA1/16W | 1 |
| R611 | 401 105 1204 | MT-GLAZE 120K JA1/16W | 1 |
| R612 | 401 105 1709 | MT-GLAZE 150K JA1/16W | 1 |
| R613 | 401 105 1204 | MT-GLAZE 120K JA1/16W | 1 |
| R614 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R615 | 401 113 8509 | MT-GLAZE 91K JA1/16W | 1 |
| R616 | 401 105 1600 | MT-GLAZE 15K JA1/16W | 1 |
| R617 | 401 105 7503 | MT-GLAZE 82K JA1/16W | 1 |
| R618 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R619 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R620 | 401 105 0702 | MT-GLAZE 100K JA1/16W | 1 |
| R621 | 401 105 3307 | MT-GLAZE 2.7K JA1/16W | 1 |
| R622 | 401 105 1501 | MT-GLAZE 1.5K JA1/16W | 1 |
| R623 | 401 105 3307 | MT-GLAZE 2.7K JA1/16W | 1 |
| R625 | 401 105 5301 | MT-GLAZE 4.7K JA1/16W | 1 |
| R626 | 401 105 0405 | MT-GLAZE 100 JA1/16W | 1 |
| R627 | 401 105 0405 | MT-GLAZE 100 JA1/16W | 1 |
| R628 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R629 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R630 | 401 105 4106 | MT-GLAZE 3.3K JA1/16W | 1 |
| R631 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R632 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R633 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R634 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R635 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R636 | 401 105 0405 | MT-GLAZE 100 JA1/16W | 1 |
| R637 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R638 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R639 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R641 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R642 | 401 105 2706 | MT-GLAZE 220 JA1/16W | 1 |
| R643 | 401 105 0603 | MT-GLAZE 10K JA1/16W | 1 |
| R644 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R645 | 401 105 5400 | MT-GLAZE 47K JA1/16W | 1 |
| R646 | 401 165 8403 | MT-GLAZE 0.000 JA1/16W | 1 |
| R647 | 401 105 2805 | MT-GLAZE 2.2K JA1/16W | 1 |

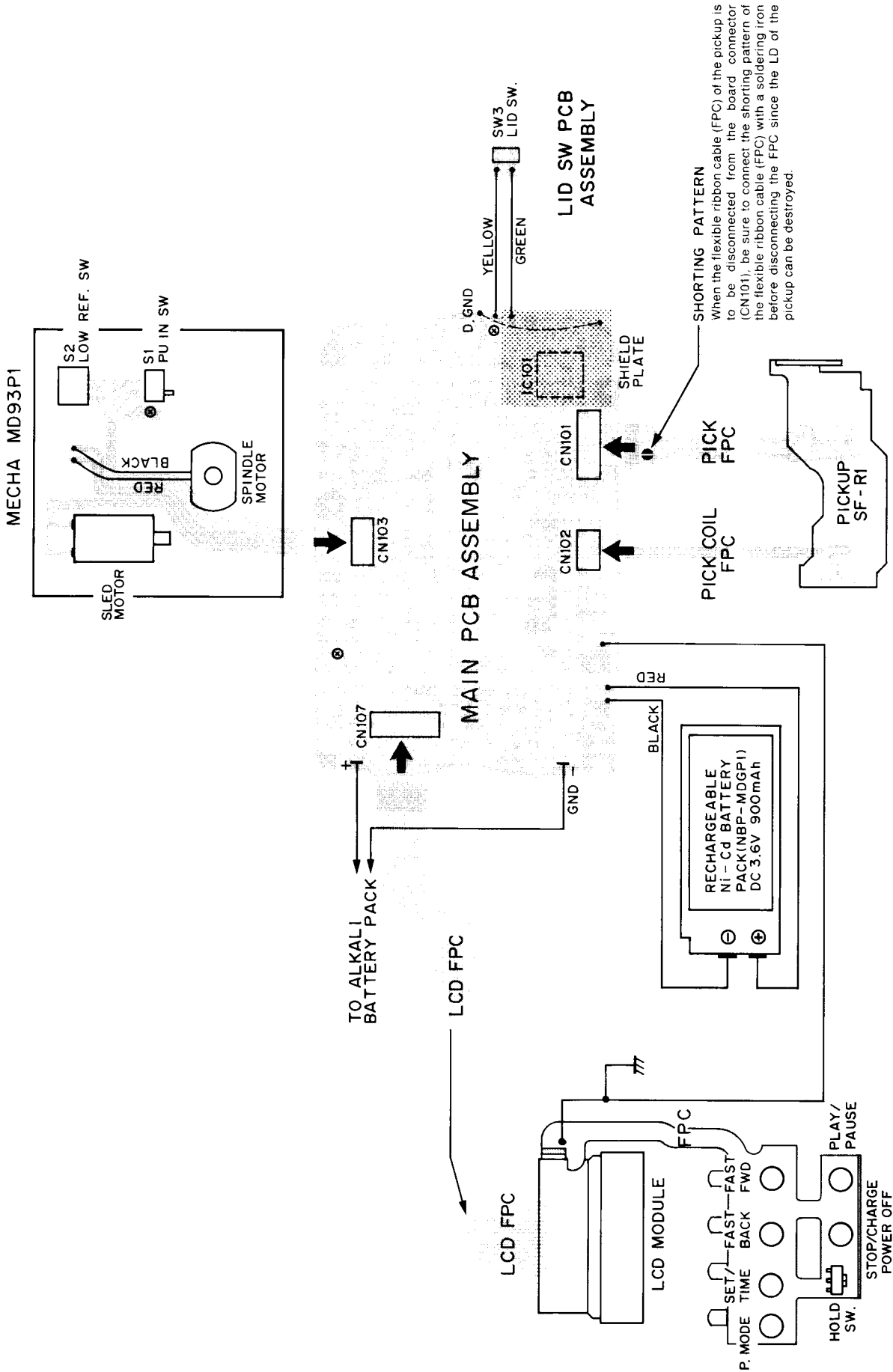
ASSY,PCB-ML,LID SWITCH

| | | | |
|-----|--------------|--------------------------|---|
| 42 | 620 218 3077 | Assy,PCB-ML,Lid Switch | 1 |
| SW3 | 620 218 2704 | Switch,Push,1-1 (LID SW) | 1 |

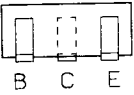
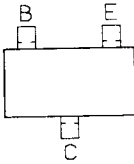
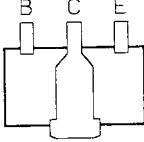
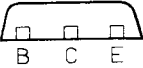
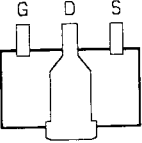
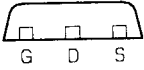
NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

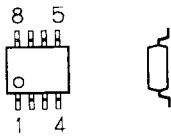
WIRING DIAGRAM



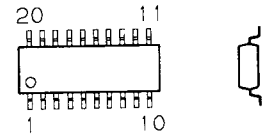
IC & TRANSISTOR LEAD IDENTIFICATION

| TRANSISTOR | FRONT VIEW | BOTTOM VIEW | TRANSISTOR | FRONT VIEW | BOTTOM VIEW |
|--|---|---|-------------------------------------|---|---|
| DTA144EU DTC143ZU DTC144EU 2SB1295 2SD1048 |  |  | 2SB1302 2SC4390 2SD2153V |  |  |
| 2SJ316 |  |  | | | |
| TERMINAL NAME | | | | | |
| B → BASE C → COLLECTOR E → EMITTER | | | S → SOURCE G → GATE D → DRAIN | | |

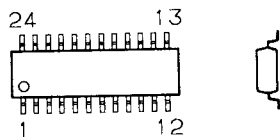
MC34063A TOP/SIDE VIEWS



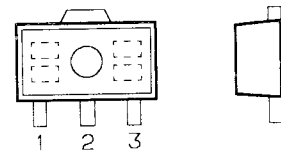
CXA1380M TOP/SIDE VIEWS



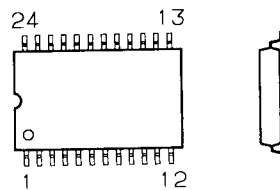
BA3570FS TOP/SIDE VIEWS



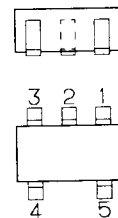
S-80715AN-DC-T1 TOP/SIDE VIEWS S-81330HG-KB-T1 TOP/SIDE VIEWS



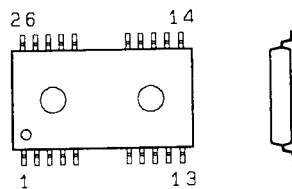
LC78835MF-TRM TOP/SIDE VIEWS



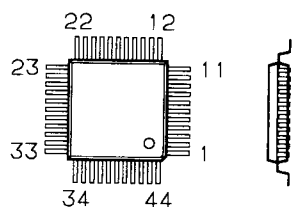
TC4S30F-TE85R TOP/SIDE VIEWS TC4S66F-TE85R TOP/SIDE VIEWS TC4S81F-TE85R TOP/SIDE VIEWS TC7S04F-TE85R TOP/SIDE VIEWS



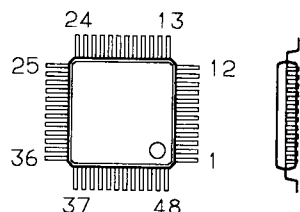
MSM514400AL-70-TS-KDR2*TOP/SIDE VIEWS



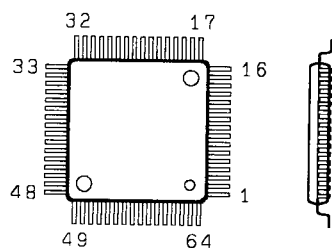
MPC1716AFU TOP/SIDE VIEWS



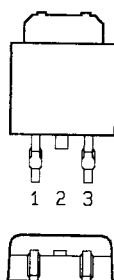
CXA1381Q TOP/SIDE VIEWS CXA1602Q TOP/SIDE VIEWS



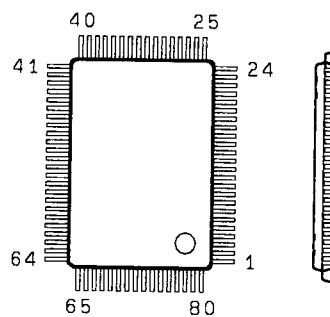
MB89P625PFM TOP/SIDE VIEWS



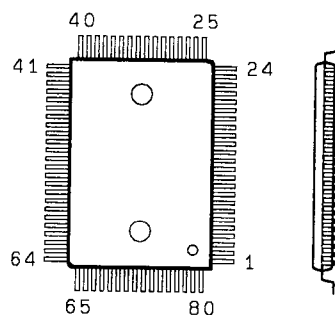
PQ05SZ11 TOP/SIDE VIEWS



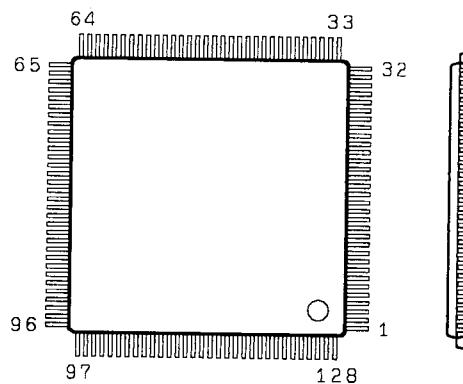
LC89601 TOP/SIDE VIEWS



CXD2500BQ TOP/SIDE VIEWS



LC89600 TOP/SIDE VIEWS



SANYO